ORDER NO. DPD83110038C2

Service Manual

Quartz Direct Drive Turntable System

SL-M1

[EG]

T4P is the standard mark for plug-in-connector type.
Products carrying this mark are interchangeable and adaptable among each other.

Area

* [EG] is available in F.R. Germany.

Please use this manual together with the service manual for Model No. SL-M1 Order No. DPD83080027C8.

- Unlike the [E] spec., this unit is furnished with S-shaped universal tonearm, and is not provided with cartridge.
- This service manual mentions only the differences from the [E] spec.

CHANGES

■ Specifications

English

■ Tonearm section

Type:	Universal tonearm "S" shaped tubular arm Static balanced type
Effective length:	230 mm (9-1/16")
Arm height adjustment range:	0 – 6 mm
Overhang:	15 mm (19/32")
Effective mass:	12 g (without cartridge)
Tracking error angle:	Within 2°32′ at the outer groove of 30 cm (12") record Within 0°32′ at the inner groove of 30 cm (12") record
Friction:	Less than 7 mg (lateral, vertical)
Stylus pressure adjustment range:	0 – 2.5 g
Headshell weight:	7.5 g
Applicable cartridge weight range:	6 g (using headshell for plug-in connector cartridge) See page 4 (using headshell for ordinary cartridge)

Technics

Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka Japan

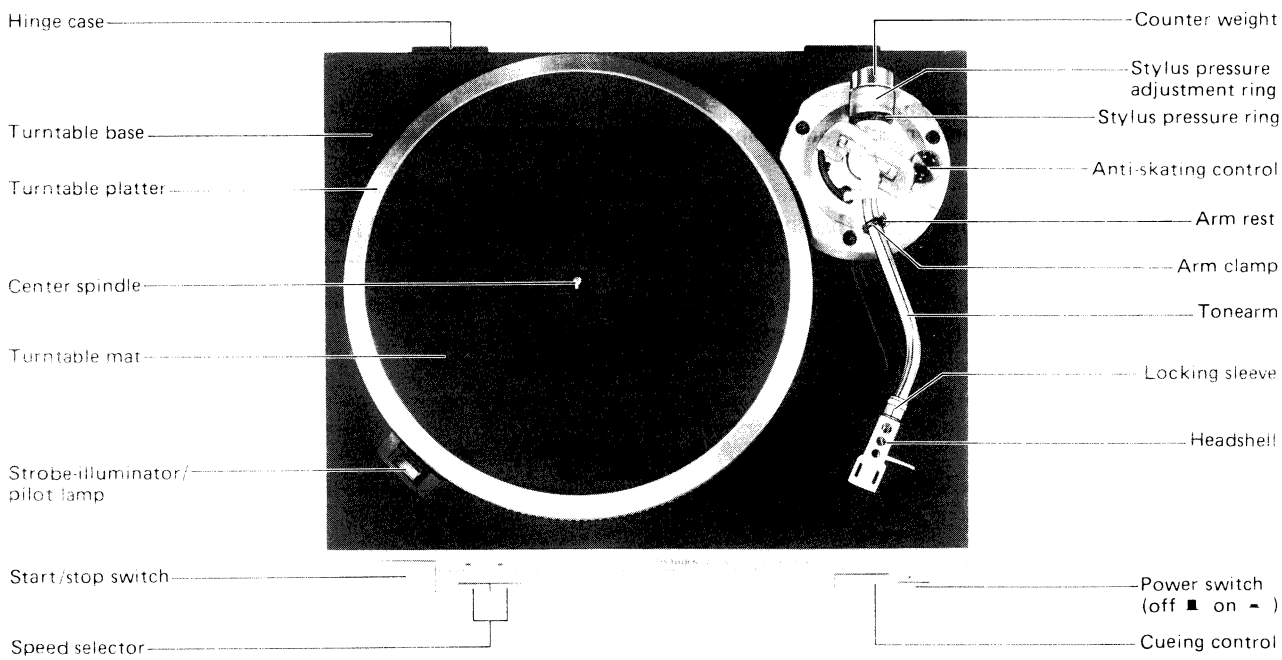
■ TECHNISCHE DATEN

Deutsch

■ Tonarm

Typ:	Universaltonarm mit "S" förmigem Rohrarm statisch balanciert	**Lagerreibung:**	Weniger als 7 mg (horizontal, vertikal)
Effektive Länge:	230 mm (9-1/16")	**Auflagekraft-Einstellbereich:**	0 – 2,5 g
Tonarmhöle-Einstellbereich:	0 – 6 mm	**Tonarmkopf-Gewicht:**	7,5 g
Überhang:	15 mm (19/32")	**Zulässiger Tonabnehmer-Gewichtbereich:**	6 g (wenn ein Tonarmkopf für Einsteck-Tonabnehmer verwendet wird) Siehe Seite 4. (wenn ein Tonarmkopf für Normtonabnehmer verwendet wird)
Effektive Masse:	12 g (ohne Tonabnehmer)		
Spurfehlwinkel:	Innerhalb 2°32′ bei der Einlaufrille einer 30 cm-Platte Innerhalb 0°32′ bei der Auslaufrille einer 30 cm-Platte		

■ LOCATION OF CONTROLS



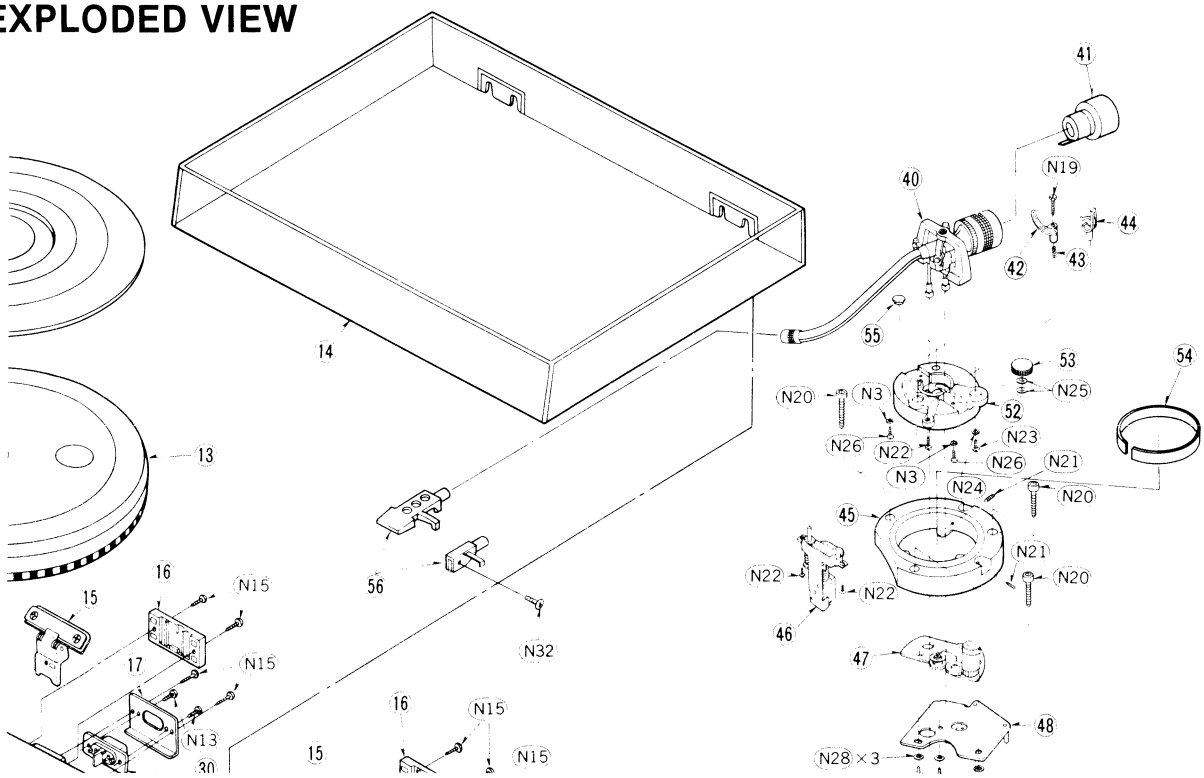
■ REPLACEMENT PARTS LIST

Note: (1) Mentioned in this parts list are only those changed in Model No. SL-M1 for destination [E] area.

Ref. No.	Change of Part No. SL-M1 [E] ➡ SL-M1 [EG]		Description	Per Set (Pcs.)	Remarks
CABINET and CHASSIS PART					
30	SFNNM01S01	SFNNM01R01	Name Plate	1	
TONEARM PARTS					
40	SFPAM0M102R	SFPAM0M101R	Tonearm Ass'y	1	
41	SFPWG0M102A	SFPWG0M101A	Counter Weight	1	
44	SFPRT0M101E	SFPRT17201K	Arm Rest	1	
56	EPC–P33AK	Deletion	———	0	
	EPS–33ES	Deletion	———	0	

Ref. No.	Change of Part No. SL-M1 [E] ➡ SL-M1 [EG]		Description	Per Set (Pcs.)	Remarks
TONEARM PARTS					
56	Addition	SFPCC0M101A	Headshell (Universal)	1	
56	Addition	SFPCC08001E	Headshell (Plug-in)	1	
57	SFCNC03301	Deletion	———	0	
ACCESSORIES					
A1	SFNUM01S01E	SFNUM01R01	Instruction Book	1	
A5	Addition	SFCZB30505	Shell Weight	1	
A6	Addition	SFPWG0M103E	Sub-Weight	1	
A7	Addition	SFK0135–01	Gage, Overhang	1	

■ EXPLODED VIEW



ADDITION

■ MEASUREMENTS AND ADJUSTMENT ——— English

- **Adjustment of arm height (Fig. 23)**

When adjusting the arm height according to the cartridge used, loosen the adjusting screw and vertically move the arm support to set the arm height so that the arm is horizontal in record play mode.

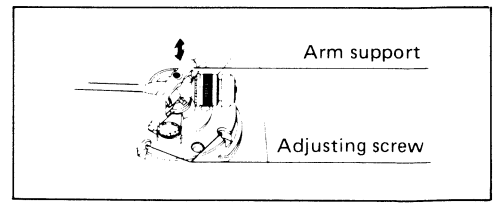


Fig. 23 (Abb. 23)

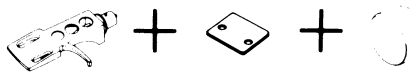
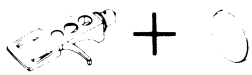
■ MEASSUNGEN UND JUSTIERUNGEN ——— Deutsch

- **Justierung der Tonarmhöhe (Abb. 23)**

Falls der von Ihnen verwendete Tonabnehmer eine andere Tonarmhöhe erfordert, die Einstellschraube lösen und den Armsupport so anheben oder senken, daß der Tonarm beim Abspielen einer Schallplatte horizontal ist.

■ WEIGHT OF CARTRIDEG USED

When a shell for ordinary cartridge is used, the cartridge can be used as shown in the table below, using the attached shell weight and auxiliary weight.

Combination with shell for ordinary cartridge	Usable cartridge	
	Stylus pressure	Weight of cartridge (incl. the weight of cartridge setscrew) 2 3 4 5 6 7 8 9 10 11 12 13g
Head shell only (7.5 g)	0 ~ 1	5.5 ⌊ ⌋ 8
	1 ~ 1.5	6 ⌊ ⌋ 8
	1.5 ~ 2	6.5 ⌊ ⌋ 8
	2 ~ 2.5	7 ⌊ ⌋ 8
Attached shell weight	0 ~ 1	3.5 ⌊ ⌋ 6
	1 ~ 1.5	4 ⌊ ⌋ 6
	1.5 ~ 2	4.5 ⌊ ⌋ 6
	2 ~ 2.5	5 ⌊ ⌋ 6
 Attached auxiliary weight	0 ~ 1	7.5 ⌊ ⌋ 10
	1 ~ 1.5	8 ⌊ ⌋ 10
	1.5 ~ 2	8.5 ⌊ ⌋ 10
	2 ~ 2.5	9 ⌊ ⌋ 10
	0 ~ 1	9.5 ⌊ ⌋ 12
	1 ~ 1.5	10 ⌊ ⌋ 12
	1.5 ~ 2	10.5 ⌊ ⌋ 12
	2 ~ 2.5	11 ⌊ ⌋ 12

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ORDER NO. DPD83080027C8

Service Manual

Quartz Direct Drive Turntable System

SL-M1

[E], [EK], [EG], [EB], [EH],
[EF], [Ei], [EC], [XL], [XA], [XM]

T4P is the standard mark for plug-in-connector type.
Products carrying this mark are interchangeable and adaptable among each other.

Areas

* [E] is available in Switzerland and Scandinavia.
* [EK] is available in United Kingdom.
* [EG] is available in F.R. Germeny.
* [EB] is available inBelgium.
* [EH] is available in Holland.
* [EF] is available in France.
* [Ei] is available in Italy.
* [EC] is avaiable in Czechoslovakia.
* [XL] is available in Australia.
* [XA] is abailable in Southeast Asia, Oceania, Africa, Middle Near East and Central South America.
* [XM] is available in Central South America.

Specifications

Specifications are subject to change without notice for further improvement.
Weight and dimensions shown are approximate.

■ General

Power supply:	~110—120/220—240V, 50 or 60 Hz
Power consumption:	20 W
Dimensions: (W×H×D)	45.3 × 17 × 40.6 cm (17-27/32" × 6-11/16 × 15-63/64) Maximum height when dust cover is open 45.3 × 43 × 45.4 cm (17-27/32" × 16-15/16" × 17-7/8")
Weight:	10,2 kg

■ Turntable section

Type:	Quartz direct drive Manual turntable Auto lift-up
Drive method:	Direct drive
Motor:	Brushless DC motor
Drive control method:	Quartz-phase-locked control
Turntable platter:	Aluminum die-cast Diameter 32.5 cm Weight 2.5 kg (including turntable mat)
Turntable speeds:	33-1/3 rpm and 45 rpm
Starting torque:	1.6 kg·cm
Build-up characteristics:	0.9 s. to 33-1/3 rpm
Braking system:	Electronic brake
Speed change due to load torque:	0% within 1.0 kg cm
Wow and flutter:	0.008% WRMS* 0.022% WRMS (JIS C5521) ±0.031% peak (IEC 98A Weighted)

* This rating refers to turntable assembly alone, excluding effects of record, cartridge or tonearm, but including platter. Measured by obtaining signal from built-in frequency generator of motor assembly.

Rumble:	−70 dB (IEC 98A Unweighted) −82 dB (IEC 98A Weighted)

■ Tonearm section

Type:	Statically-balanced straight tonearm Plug-in connector cartridge system
Effective length:	230 mm (9-1/16")
Overhang:	15 mm (19/32")
Effective mass:	13.5 g (including cartridge)
Tracking error angle:	Within 2°32' at the outer groove of 30 cm (12") record Within 0°32' at the inner groove of 30 cm (12") record
Friction:	Less than 7 mg (lateral, vertical)
Stylus pressure adjustment range:	1.25 ±0.25 g
Applicable cartridge weight range:	6 g

Technics

Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka Japan

■ Cartridge section

Type:	Moving magnet stereo cartridge
Magnet circuit:	All laminated core
Frequency response	10 Hz ~ 50 kHz 20 Hz ~ 10 kHz ±1 dB
Output voltage:	2.5 mV at 1 kHz, 5 cm/s. zero to peak lateral velocity (7 mV at 1 kHz, 10 cm/s. zero to peak 45° velocity [DIN 45 500])
Channel separation:	22 dB at 1 kHz
Channel balance:	Within 1.8 dB at 1 kHz
Recommended load impedance:	47 kΩ~100 kΩ
Compliance (dynamic):	12×10^{-6} cm/dyne at 100 Hz
Stylus pressure range:	1.25 ±0.25 g (12.5± 2.5 mN)
Weight:	6 g (cartridge only)
Replacement stylus:	EPS-33ES

■ CONTENTS

	Page
SAFETY PRECAUTION	2
LOCATION OF CONTROLS	3
DISASSEMBLY INSTRUCTIONS	4
TROUBLE SHOOTING	8
CIRCUIT BOARD AND WIRING CONNECTION DIAGRAM	10
SCHEMATIC DIAGRAM	13
MEASUREMENTS AND ADJUSTMENT	13
RESISTORS AND CAPACITORS	16
BLOCK DIAGRAM	17
REPLACEMENT PARTS LIST (Electrical Parts)	20
EXPLODED VIEW	21
REPLACEMENT PARTS LIST (Mechanical Parts)	23
PACKING	24

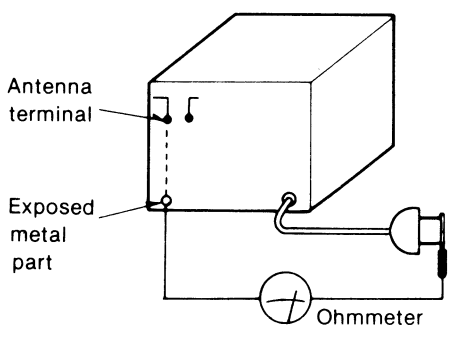
■ SAFETY PRECAUTION

1. Before servicing, unplug the power cord to prevent an electric shock.
2. When replacing parts, use only manufacturer's recommended components for safety.
3. Check the condition of the power cord. Replace if wear or damage is evident.
4. After servicing, be sure to restore the lead dress, insulation barriers, insulation papers, shields, etc.
5. Before returning the serviced equipment to the customer, be sure to make the following insulation resistance test to prevent the customer from being exposed to a shock hazard.

• INSULATION RESISTANCE TEST

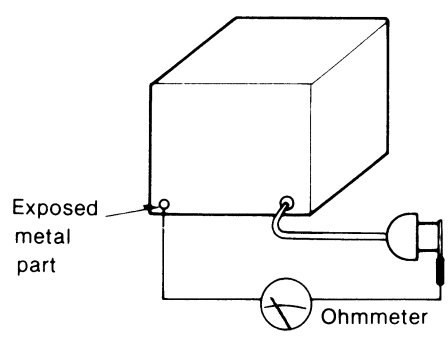
1. Unplug the power cord and short the two prongs of the plug with a jumper wire.
2. Turn on the power switch.
3. Measure the resistance value with ohmmeter between the jumpered AC plug and each exposed metal cabinet part, such as screwheads antenna, control shafts, handle brackets, etc. Equipment with antenna terminals should read between 3MΩ and 5.2MΩ to all exposed parts. (Fig. A) Equipment without antenna terminals should read approximately infinity to all exposed parts. (Fig. B)

Note: Some exposed parts may be isolated from the chassis by design. These will read infinity.



(Fig. A)

Resistance = 3MΩ—5.2MΩ



(Fig. B)

Resistance = Approx ∞

4. If the measurement is outside the specified limits, there is a possibility of a shock hazard. The equipment should be repaired and rechecked before it is returned to the customer.

ORDER NO. DPD83080027C8A

Quartz Direct Drive Automatic Turntable System SL-M1

DEUTSCH

- This booklet contains the specification and adjusting procedure for SL-MI, written Germany, French and Spanish.
- File this manual together with the SL-MI service manual (Order No. DPD83080027C8).

- Diese Broschüre enthält die technischen Daten und der Beschreibungen der Justiermethoden für SL-MI in deutscher, französischer und spanischer Sprache.
- Bewahren Sie das Büchlein zusammen mit der Bedienungsanleitung für SL-MI (Betstell-Nr. DPD83080027C8) auf.

- Cette brochure contient les spécifications et les procédures de réglage pour le SL-MI, écrites en allemand, en français et en espagnol.
- Classer ce manuel en même temps qu'avec le manuel de service du SL-MI (N° d'ordre:DPD83080027C8).

- Este librito contiene las especificaciones y procedimientos de ajuste para SL-MI, escritas en alemán, francés y eapañol.
- Guardar eate menual juntamente con el manual de servicio de SL-MI (Pedido N°. DPD83080027C8).

DEUTSCH

■ TECHNISCHE DATEN

Anderungen der technischen Daten vorbehalten.
Die angegebenen Gewichts- und Abmessungsdaten sind ungeähre Werte.

■ Allgemeine Daten

Stromversorgung:	~110-120/220-240 V, 50/60 Hz
Leistungsaufnahme:	20 W
Abmessungen:	
(B×H×T)	45,3 × 17 × 40,6 cm Maximale Höhe bei geöffnetem Oberteil (Staubabdeckung). 45,3 × 43 × 45,4 cm
Gewicht:	10,2 kg

■ Plattenspieler

Typ:	Manueller Quartz-Direktantrieb-Plattenspieler Auto-Anhebung
Antrieb:	Direktantrieb
Motor:	Kollektorloser Gleichstrommotor
Antriebsregel-Methode:	Quarz-Steuerung QPL
Plattenteller:	Aluminium-Spritzguß Durchmesser 32,5 cm Gewicht: 2,5 kg (einschließlich Plattentellermatte)
Plattenteller-Drehzahlen:	33-1/3 und 45 U/min
Anlaufdrehmoment:	1,6 kg·cm
Drehzahl-Hochlaufzeit:	0,9 s. vom Stillstand auf 33-1/3 U/min
Bremssystem:	Elektronische Bremse
Drehzahl-Abweichung aufgrund von Lastschwankungen:	0% innerhalb 1,0 kg·cm
Gleichlaufschwankungen:	0,008% WRMS* 0,022% WRMS (JIS C5521) ±0,031% Spitze (IEC 98A bewertet)

* Diese Nennleistung bezieht sich auf den Laufwerk-Bauteil allein, ausschließlich Einflüsse von Schallplatte, Tonabnehmer oder Tonarm, aber einschließlich Plattenteller. Gemessen anhand von Signalen vom eingebauten Frequenzgenerator des Motorbauteils.

Rumpel-Fremdspannungsabstand:	−70 dB (IEC 98A unbewertet)
Rumpel-Geräuschspannungsabstand:	−82 dB (IEC 98A bewertet)

■ Tonarm

Typ:	Statisch balanciertes Tonabnehmersystem vom Einsteck-Typ
Effektive Länge:	230 mm
Überhang:	15 mm
Effektive Masse:	13,5 g (einschließlich Tonabnehmer)
Spurfehlwinkel:	Innerhalb 2°32' bei der Einlaufrille einer 30 cm-Platte Innerhalb 0°32' bei der Auslaufrille einer 30 cm-Platte
Lagerreibung:	Weniger als 7 mg (horizontal, vertikal)
Auflagekraft-Einstellbereich:	1,25 ±0,25 g
Zulässiger Tonabnehmer-Gewichtbereich:	6 g

■ Tonabnehmer

Typ:	Stereo-Magnet-Tonabnehmer mit Einpunkt-Aufhängungssystem
Magnetkreis:	Ganzlamellenkern
Frequenzgang:	10 Hz bis 50 kHz 20 Hz bis 10 kHz ±1 dB
Ausgangsspannung:	2,5 mV bei 1 kHz 5 cm/s. Null-zu-Spitze, lateral [7 mV bei 1 kHz 10 cm/s. Null-zu-Spitze, 45° (DIN 45 500)]
Kanaltrennung:	22 dB bei 1 kHz
Kanalabweichung:	Innerhalb 1,8 dB bei 1 kHz
Empfohlene Endimpedanz:	47 kΩ ~ 100 kΩ
Nachgiebigkeit (dynamisch):	12×10^{-6} cm/dyn bei 100 Hz
Auflagekraft-Einstellbereich:	1,25 ±0,25 g (12,5 ±2,5 mN)
Gewicht:	6 g (nur Tonabnehmer)
Ersatznadel:	EPS-33ES

• Justierung der Tonarmlifthöhe (Abb.18 und 19)

Die Anhebehöhe des Tonarms (Distanz zwischen Nadelspize und Plattenoberfläche bei angehobenem Tonarm) wurde in der Fabrik vor dem Versand auf ca. 5—7 mm eingestellt.
Falls der Abstand zu groß oder zu klein wird, drehen Sie die Justierschraube im Uhrzeigersinn oder Gegenuhrzeigersinn während Sie die Tonarmliftführung nach unten drucken.

Drehung im Uhrzeigersinn
—Der Abstand wird kleiner.
Drehung im Gegenuhrzeigersinn
—Der Abstand wird größer.

• Einetellung der automatischen Anhebeposition (Lift) (Abb.20)

1. Setzen Sie den Nadelschutz auf den Tonabnehmer auf.
2. Die Gummikappe abnehmen.
3. Führen Sie den Tonarm gegen die Plattenmitte. Die Auto-Anhebungseinstellschraube wird erscheinen.
4. Drehen Sie die Justierschraube mit einem Schraubenzieher im Uhrzeigersinn oder entgegen dem Uhrzeigersinn, wie erforderlich.
   Falls der Tonarm die Neigung hat, sich vor dem Beendigen des Abspiels von der Schallplatte abzuheben,
   —im Gegenuhrzeigersinn drehen.
   Falls der Tonarm sich nach der Endrille nicht abhebt,
   —im Uhrzeigersinn drehen.

• Justierung der Bremse

1. Die stromzufuhr einschalten und den Drehzahl-Wahlschalter auf "33 UpM einstellen.
2. Die Stoptaste im rotierenden Zustand drücken und VR201 so abstimmen, daß der Plattenteller innerhalb 90°—180° stoppt. **(Siehe Abb.21)**

• Justierung der Schlitzplatten-Abstands

1. Die beiden Justierschrauben so einstellen, daß der Abstand zwischen der Schlitzplatte und dem Fotokoppler 1,0 ±0,2mm beträgt. **(Siehe Abb.22.)**
2. Überprüfen, da die Schlitzplatte parallel zum Koppler ist.

• Justierung der Ausgangsspannung (Abb.22)

1. Die Bodenplatte entfernen und ein Oszilloskop an Stift 2 der Sensorplatine BT601 anschließen.
2. Eine Platte mit 1mm-Rillenabstand bei 33 UpM abspielen und dann VR601 justieren, so daß die Wellenform wie nachstehend gezeigt ist, und zwar bei einer Position innerhalb 65mm von der Plattenmitte.

FRANÇAIS

■ CARACTERISTIQUES

Les spécifications sont susceptibles d'être modifiées sans préavis.
Le poids et les dimensions donnés sont approximatifs.

■ Généralités

Alimentation:	Alternatif 110-120/220-240V, 50/60 Hz
Consommation:	20 W
Dimensions: (L×H×P)	45,3 × 17 × 40,6 cm Hauteur maximum lorsque le couvercle protège-poussière est ouvert: 45,3 × 43 × 45,4 cm
Poids:	10,2 kg

■ Platine de lecture

Type:	Entaînement direct à quartz Platine manuelle Soulèvement automatique
Système d'entraine-ment:	Entraînement direct
Moteur:	Moteur C.C. sans balai
Groupe de réglage:	Réglage d'accrochage de phase par quartz
Plateau de lecture:	En aluminium moulé sous pression Diamètre 32,5 cm Poids 2,5 kg (y compris le tapis du plateau)
Vitesses de rotation:	33-1/3 et 45 t/p.m.
Couple de démarrage:	1,6 kg·cm
Caractérisques d'augmentation:	0,9 s. à 33-1/3 t/p.m.
Système de freinage:	Frein électronique
Variation de vitesse due au couple de charge:	0% en deçà de 1,0 kg·cm
Pleurage et scintille-ment:	0,008% de valeur efficace* 0,022% de valeur efficace (JIS C5521) ±0,031% de crête (IEC 98A Pondéré)

* Ce régime nominal se rapporte à l'ensemble du tourne-disque seul, excluant les effets du disque, de la cellule pick-up ou du bras de lecture, mais comprenant le plateau. Mesuré par l'obtention d'un signal provenant du généra-teur de fréquences incorporé de l'ensemble du moteur.

Ronflement:	−70 dB (IEC 98A Non pondéré) −82 dB (IEC 98A Pondéré)

■ Bras de lecture

Type:	Bras de lecture rectiligne statiquement équilibré Système de cellule de lecture à connecteur enfichable.
Longueur effective:	230 mm
Porte-à-faux:	15 mm
Angle d'erreur de piste:	En deçà de 2°32' au sillon extérieur d'un disque de 30 cm En deçà de 0°32' au sillon intérieur d'un disque de 30 cm
Frottement:	Moins de 7 mg (latéral et vertical)
Masse réelle:	13,5 g (avec la cellule pick-up)
Plage de réglage de la pression d'appui:	1,25 ±0,25 g
Gamme du poids des cellules pick-up utilisables:	6 g

■ Cellule pick-up

Type:	Cellule pick-up stéréo à aimant mobile
Circuit magnétique:	Noyau entièrement feuilleté
Réponse en fréquence:	10 Hz à 50 kHz 20 Hz à 10 kHz ±1 dB
Tension de sortie:	2,5 mV à 1 kHz; 5 cm/s., zéro à vitesse latérale de crête (7 mV à 1 kHz; 10 cm/s., zéro à vitesse 45° de crête [DIN 45 500])
Séparation des canaux:	22 dB à 1 kHz
Equilibrage des canaux:	En deçà de 1,8 dB à 1 kHz
Impédance de charge recommandée:	47 kΩ~100 kΩ
Elasticité (dynamique):	12×10^{-6} cm/dyne à 100 Hz
Plage de la force verticale d'appui:	1,25 ±0,25 g (12,5 ±2,5 mN)
Poids:	6 g (cellule seule)
Pointe de lecture de remplacement:	EPS-33ES

• Mise au point de la hauteur de l'élévateur du bras (Figs.18 and 19)

La hauteur d'élévation du bras (distance entre l'extrémité de la pointe de lecture et la surface du disque lorsque le bras de lecture est soulevé) a été ajustée à l'usine avant l'expédition sur approximativement 5—7 mm.
Si l'écartement devient trop étroit ou trop large, tourner la vis de réglage dans le sens des aiguilles d'une montre ou en sens inverse, tout en abaissant l'élévateur du bras.
Rotation dans le sens des aiguilles d'une montre.
—La distance entre la surface du disque et l'extrémité de la pointe de lecture diminue.
Rotation dans le sens coutraire des aiguilles d'une montre.
—La distance entre la surface du disque et l'exrémité de la pointe de lecture augmente.

• Ajustement de la position de soulévement automatique (Fig.20)

1. Placer le capot protecteur de la pointe de lecture sur la cellule pick-up.
2. Retirer le capuchon en caoutchouc.
3. Libérer le clip de retenue du bras et déplacer le bras de lecture vers le centre du disque.
   La vis d'ajustement de soulévement automatique apparaîtra.
4. Avec un tournevis, tourner la vis de réglage dans le sens des aiguilles d'une montre ou dans le sens inverse selon la nécessité.
   Si le bras de lecture a tendance à se soulever de la surface du disque avant que l'audition de soit achevée:
   —Tourner dans le sens inverse des aiguilles d'une montre.
   Si le bras de lecture ne réussit pas à se soulever aprés le sillon final:
   —Tourner dans le sens des aiguilles d'une montre.

• Ajustement du frein

1. Tourner l'alimentation en courant sur "on" (en circuit) et régler le sélecteur de vitesse sur "33 r.p.m." (33t/p.m.).
2. Appuyer sur la touche d'arrêt dans le mode de rotation et ajuster VR201 de telle sorte que le plateau de lecture s'arrête en deçà dúne plage de 90°—180°. **(Voir la Fig.21)**

• Ajustement de l'intervalle de la plaque á fente

1. Régler les deux vis dájustement de telle sorte que l'intervalle entre la plaque à fente et le coupleur photoélectrique soit de 1,0 ± 0,2mm. **(Voir la Fig.22)**
2. Sássurer que la plaque à fente soit parallèle au coupleur.

• Ajustement de la tension de sortie (Fig.22)

1. Retirer la plaquette de la face inférieure et raccorder un oscilloscope à la broche 2 de la plaquette du dispositif de détection BT601.
2. Le laisser tracer un disque à l'écart de 1mm à 33t/p.m., puis ajuster VR601 de telle sorte que la forme d'onde soit telle qu'elle est montrée ci-dessous dans une position d'en deçà 65mm à partir du centre du disque.

ESPAÑOL

■ ESPECIFICACIONES

Las especificaciones quedan sujetas a cambios sin aviso previo.
El peso y las dimensiones indicados son apromimados.

■ En general

Alimentación de corriente:	110—120/220—240V, 50/60 Hz
Consumo de corriente:	20 W
Dimensiones: (Ancho×Alto×Prof.)	45,3 × 17 × 40,6 cm Altura máxima cuando la tapa contra el polvo está abierta: 45,3 × 43 × 45,4 cm
Peso:	10,2 kg

■ Sección del plato giratorio

Tipo:	Plato giratorio manual con accionamiento directo por cuarzo con elevación automática
Método de accionamiento:	Accionamiento directo
Motor:	Motor de corriente continua sin escobillas
Método de control de accionamiento:	Control enclavado de fase de cuarzo
Platillo del plato giratorio:	De aluminio fundido Diámetro 32,5 cm Peso 2,5 g (incluyendo la almohadilla del plato giratorio)
Velocidades del plato giratorio:	33-1/3 y 45 rpm
Par de arranque:	1,6 kg·cm (1,3 lb·pulg.)
Características de establecimiento:	0,9 s. a 33-1/3 r.p.m.
Sistema de frenado:	Freno electrónico
Cambio de velocidad debido al par motor de carga:	0% sin exceder 1,0 kg cm (0,87·pulg.)
Ululaciones y trémolo:	0,008% WRMS* 0,022% WRMS (JIS C5521) ±0,031% cresta (IEC 98A Ponderado)
Ruido de rodadura:	−70 dB (IEC 98A No ponderado) −82 dB (IEC 98A Ponderado)

* Estas características se refieren únicamente al conjunto del plato giratorio, con exclusión de los efectos provenientes del disco, cartucho o del brazo sonoro, incluyendo, empero, el platillo. La medida fue tomada por medio de la señal obtenida del generador de frecuencia incorporado del conjunto del motor.

■ Sección del brazo sonoro

Tipo:	Brazo sonoro recto equilibrado estáticamente Sistema de cartucho con conector enchufable
Longitud efectiva:	230 mm
Proyección:	15 mm
Masa efectiva:	13,5 g (incluyendo el cartucho)
Angulo de error de seguimiento:	Inferior a 2°32' en el surco exterior de un disco de 30 cm Inferior a 0°32' en el surco interior de un disco de 30 cm
Fricción:	Menos de 7 mg (en sentido lateral y vertical)
Radio de ajuste de la presión de la aguja:	1,25 ±0,25 g
Radio de peso de cartucho utilizable:	6 g

■ Sección del cartucho

Tipo:	Cartucho estereofónico de imán móvil
Circuito magnético:	Núcleo totalmente laminado
Respuesta de frecuencia:	10 Hz a 50 kHz 20 Hz a 10 kHz ±1 dB
Voltaje de salida:	2,5 mV a 1 kHz velocidad lateral de cero a cresta de 5 cm/s. [7 mV a 1 kHz Velocidad de 45° de cero a cresta de 10 cm/s. (DIN 45 500)]
Separación de canales:	22 dB a 1 kHz
Equilibrio de canales:	Inferior a 1,8 dB a 1 kHz
Impedancia de carga recomendada:	47 kΩ a 100 kΩ
Elasticidad (dinámica):	12×10^{-6} cm/dina a 100 Hz
Radio de presión de la aguja:	1,25 ±0,25 g (12,5 ±2,5 mN)
Peso:	6 g (cartucho solamente)
Aguja de recambio:	EPS-33ES

• Ajuste de la altura de elevaciòn del brazo (Figs. 18 y 19)

La altura de elevación del brazo (o sea, la distancia entre la punta de la aguja y la superficie del disco cuando el brazo sonoro está alzado) ha sido regulada aproximadamente entre 5 y 7 mm antes de despachar el equipo de la fábrica. En caso que la distancia se vuelve demasiado abundante o demasiado escasa, habrá que girar el tornillo de ajuste hacia la derecha o hacia la izquierda mientras se empuja para abajo la elevación del, brazo.

Rotación hacia la derecha
—reduce la distancia entre el disco y la punta de la aguja.
Rotación hacia la izquierda
—aumenta la distancia entre el disco y la punta de la aguja.

• Ajuste de la posiciòn de elevaciòn automática (Fig.20)

1. Colocar la protección de la aguja en el cartucho.
2. Quitar la tapita de goma.
3. Soltar la grapa del brazo y mover el brazo sonoro hacia el centro del disco.
   Aparecerá el tornillo de ajuste de elevación automática.
4. Girar el tornillito de ajuste hacia la derecha o hacia la izquierda usando un destornillador, según sea necesario.
   En caso que el brazo tienda a levantarse de la superficie del disco antes de que se acabe de tocar el disco,
   —Girar hacia la izquierda.
   En caso que el brazo sonoro no se alce después de tocar el último surco,
   —Girar hacia la derecha.

• Ajuste del freno

1. Encender la alimentación de corriente y poner el selector de velocidad en "33 r.p.m.".
2. Apretar el botón de parada en estado giratorio y regular VR201 de manera tal que el platillo del plato giratorio cese de girar en un ámbito de 90°—180°. **(Ver la Fig.21)**

• Ajuste de intervalo de la place de la hendidura

1. Regular los dos tornillos de ajuste de manera que el intervalo entre la placa de la hendidura y el fotoacoplador resulte 1,0 ± 0,2 mm. **(Ver la Fig.22)**
2. Cerciorarse de que la placa de la hendidura quede paralela al acoplador.

• Ajuste de voltaje de salida (Fig.22)

1. Quitar la tabla del fondo y conectar un osciloscopio al pasador 2 del tablero sensor BT601.
2. Dejarlo recorrer un disco con paso de 1mm a 33 revoluciones pasando luego a regular VR601 de manera tal que la forma de onda resulte como se ilustra a continuación en la posición comprendida entre 65mm a partir del centro del disco.

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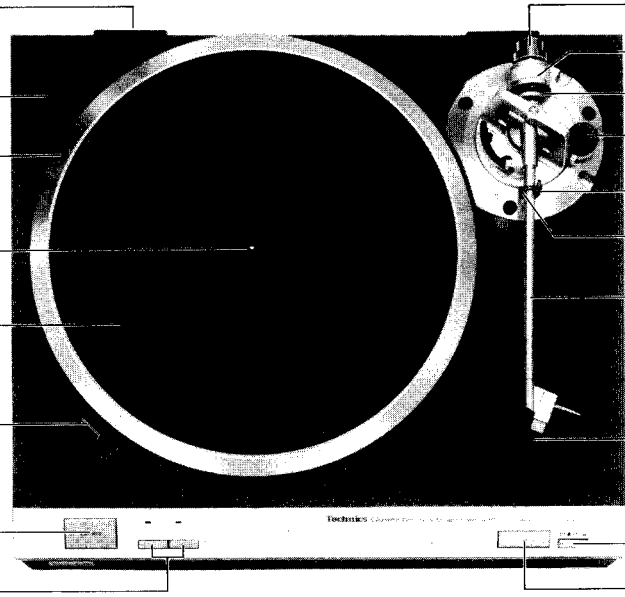
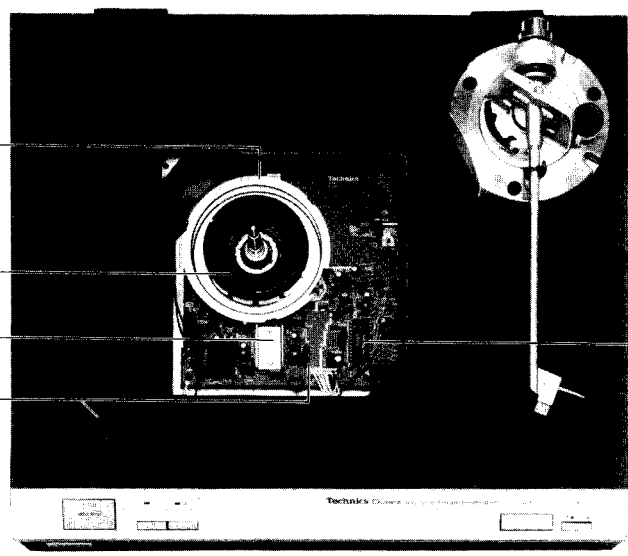
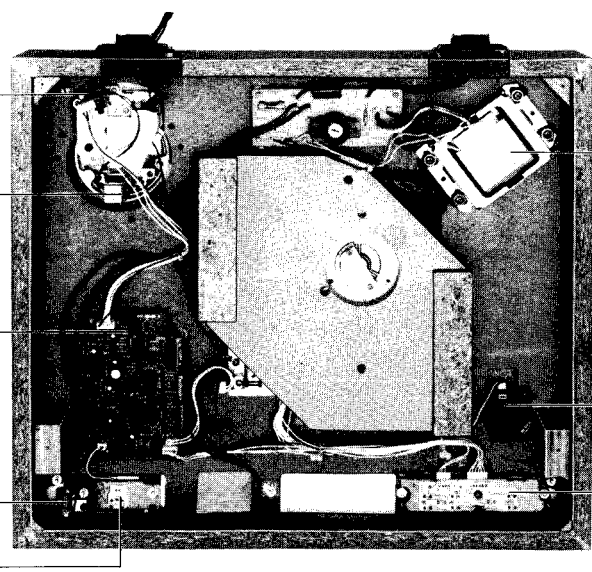
■ LOCATION OF CONTROLS







■ DISASSEMBLY INSTRUCTIONS

• How to remove the bottom board

1. Open the dust cover and remove the turntable mat and turntable platter.
2. Turn over the unit on a soft cloth taking care not to damage the cabinet and dust cover.
3. Remove the 6 setscrews (**Fig. 1 : ❶~❻**) of the bottom board.

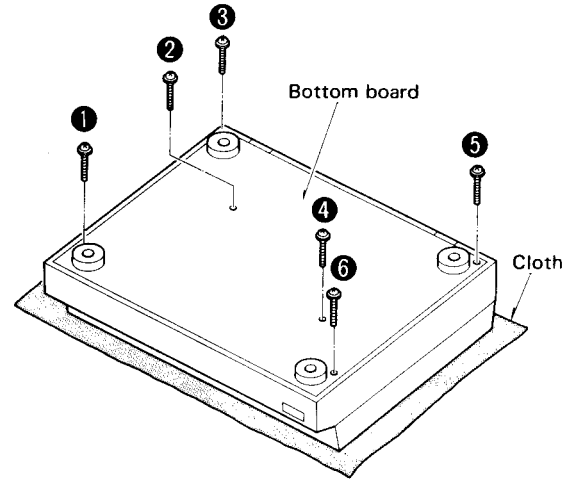


Fig. 1

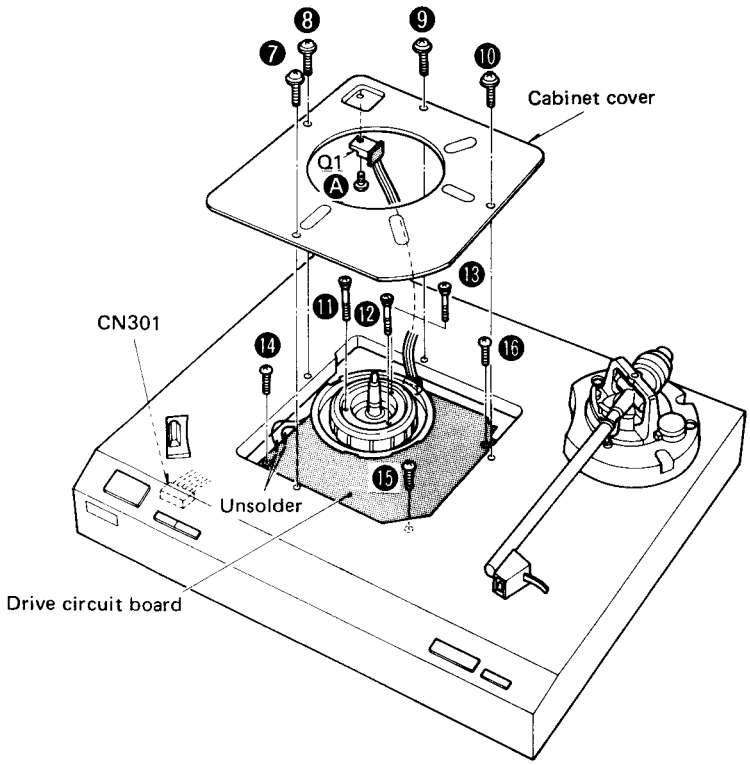


Fig.2

• How to remove the drive circuit board

1. Remove the bottom board. (**Refer to "How to remove the bottom board".**)
2. Remove the connector CN301 from the Start/Stop circuit board.
3. And remove the connector CN401 from the pich control circuit board.
4. Return the unit and open the dust cover.
5. Remove the 4 cabinet cover setscrews (**Fig. 2 : ❼~❿**) and cabinet cover.
6. Remove the regulator transistor Q1 setscrew (**Fig. 2 : Ⓐ**) and unsolder the lead wires from the drive circuit board.

*When examine the drive circuit board, don't remove the connector CN301, transistor Q1 and lead wires.

7. Remove the 3 turntable shaft setscrews (**Fig. 2 : ⓫~⓭**).
8. Remove the 3 drive circuit board setscrews (**Fig. 2 : ⓮~⓰**), and then the drive circuit board can be removed.

• How to remove the surface plate.

1. Remove the bottom board (**Refer to "How to remove the bottom board"**).
2. Remove the connector CN304 from the tonearm control circuit board.
3. Remove the connector CN301 and CN305 from the Start/Stop circuit board.
4. Remove the 3 surface plate setnuts (**Fig. 3 : ⓱ ~ ⓳**).

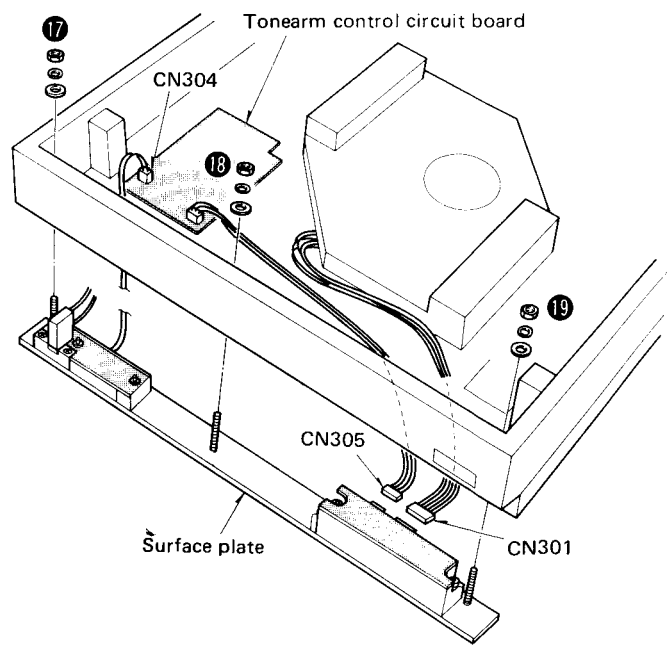


Fig. 3

• How to remove the tonearm control circuit board

1. Remove the bottom board (**Refer to "How to remove the bottom board"**).
2. Remove the connector CN303, 304 and 306 from the tonearm control circuit board.
3. Remove the transistor setscrew (**Fig. 4 :⑳**).
4. Release the 4 claws by pliers as shown in **Fig. 4**.

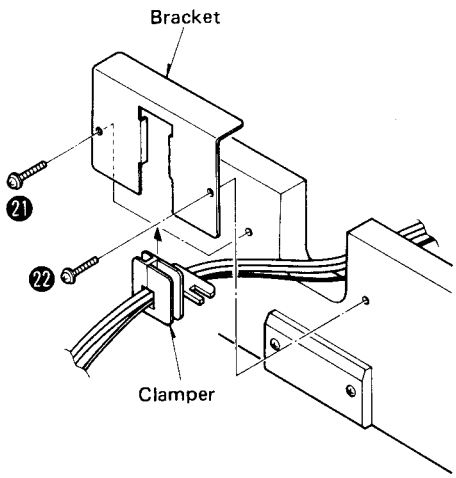


Fig. 5

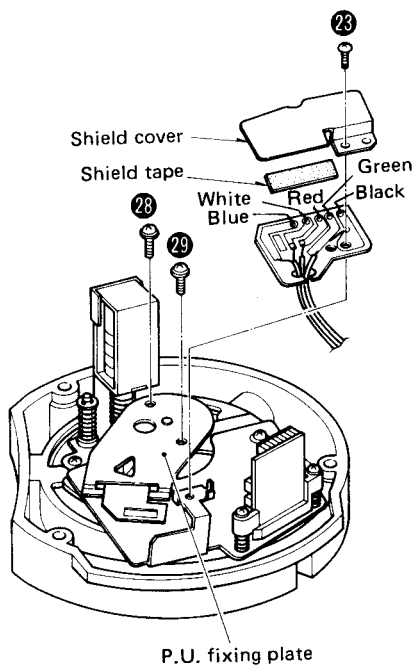


Fig. 6

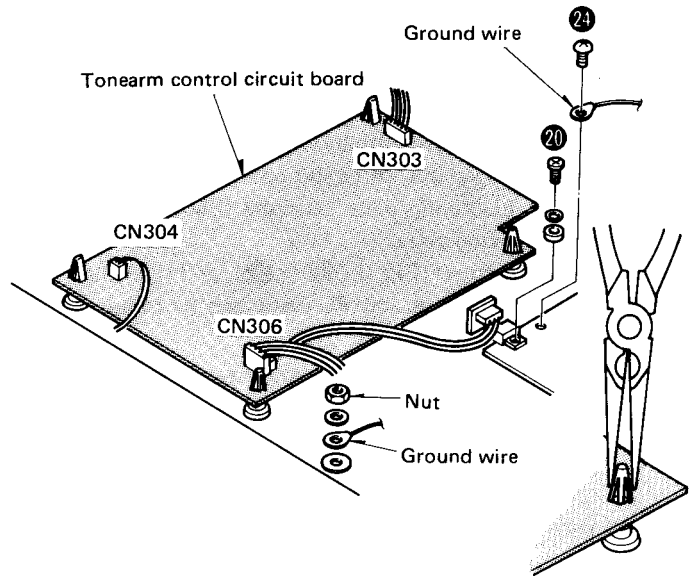


Fig. 4

• How to remove the phono output cords

1. Remove the bottom board (**Refer to "How to remove the bottom board"**).
2. Remove the 2 bracket setscrews (**Fig. 5 : ㉑ , ㉒**) and the bracket.
3. Remove the shield cover setscrew (**Fig. 6 : ㉓**) and shield cover.
4. Tear off the shield tape and unsolder the 3 lead wires from the phono output circuit board.

• How to remove the tonearm base ass'y

1. Remove the phono output cords (**Refer to "How to remove the phono output cords"**).
2. Remove the ground wire setscrew (**Fig. 4 : ㉔**) and the nut.
3. Remove the connector CN303 from tonearm control circuit board.
4. Remove the 3 tonearm base ass'y hex screws (**Fig. 7 : ㉕ ~ ㉗**) and lift the tonearm base ass'y in the direction of the arrow, and then the tonearm base ass'y can be removed.

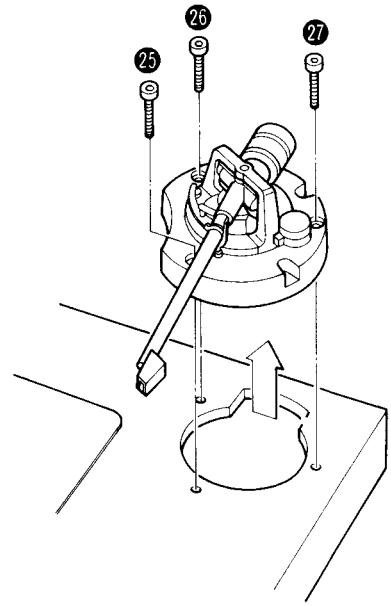


Fig. 7

• How to remove the sensor circuit board base and PU plate

1. Remove the tonearm base ass'y. (**Refer to "How to remove the tonearm base ass'y"**).
2. Unsolder the 5 lead wires (blue, white, red, green and black) from the phono output circuit board (**Fig. 6**).
3. Remove the 2 PU fixing plate setscrew (**Fig. 6 : ㉘ , ㉙**) and the PU fixing plate.
4. Remove the 3 setscrews (**Fig. 8 : ㉚ ~ ㉜**), and then the sensor circuit board base and PU plate can be removed.

Notes: Fitting of PU plate.

Fit the PU plate so that the hook of canceller spring touches the PU starting shaft as shown **Fig. 9** when the scale of antiskating knob is 0.6 ~ 0.9 with the arm calmped.

• How to remove the tonearm lift base

1. Remove the tonearm base ass'y (**Refer to "How to remove the tonearm base ass'y"**).
2. Remove the tonearm lift setscrew (**Fig. 10 : ㉝**).
3. Unsolder the 2 lead wires from the sensor circuit board.
4. Remove the 2 lift base setscrews (**Fig. 8 : ㉞ , ㉟**) and the lift base in the direction of the arrow.

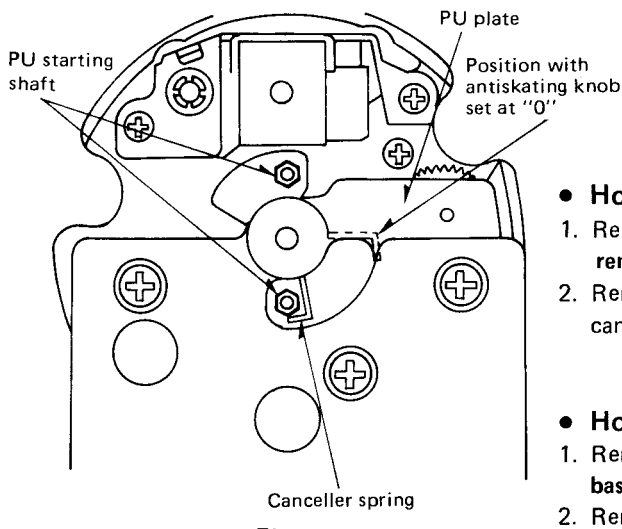


Fig. 9

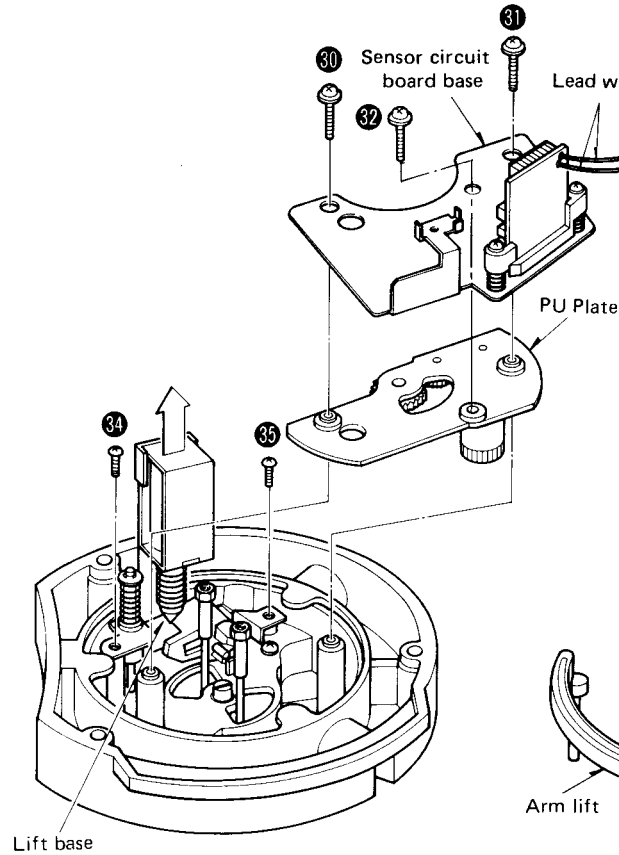


Fig. 8

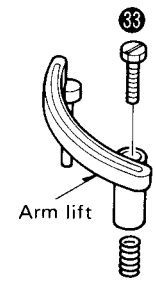


Fig. 10

• How to remove the tonearm

1. Remove the sensor circuit board base and PU plate (**Refer to "How to remove the senser circuit board base and PU plate"**).
2. Remove the 2 tonearm setscrews (**Fig. 11 : ㊱ , ㊲**), and then the tonearm can be removed.

• How to remove the tonearm base

1. Remove the tonearm lift base (**Refer to "How to remove the tonearm lift base"**).
2. Remove the tonearm (**Refer to "How to remove the tonearm"**).
3. Completely loosen the 2 tonearm base setscrew (**Fig. 12 : ㊳ , ㊴**) and then the tonearm base can be removed.

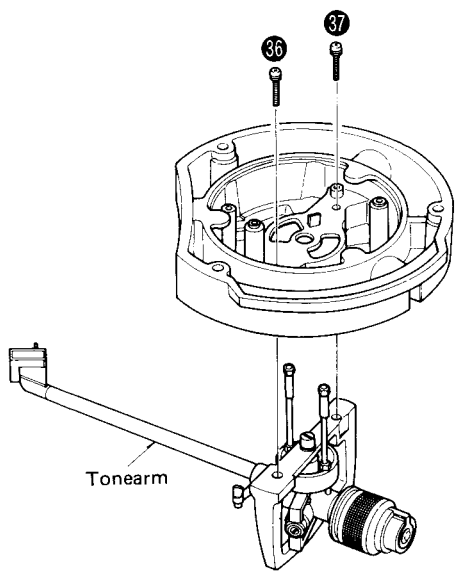


Fig. 11

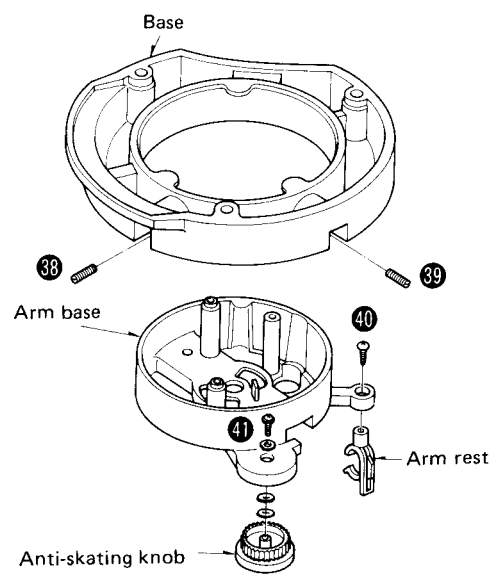


Fig. 12

- **How to remove the tonearm rest and anti-skating knob**

1. Remove the tonearm base (**Refer to "How to remove the tonearm base"**).
2. Remove the tonearm rest setscrew (**Fig. 12 :** ㊵), and then the tonearm rest can be removed.
3. Remove the anti skating knob setscrew (**Fig. 12 :** ㊶), and then the anti-skating knob can be removed.

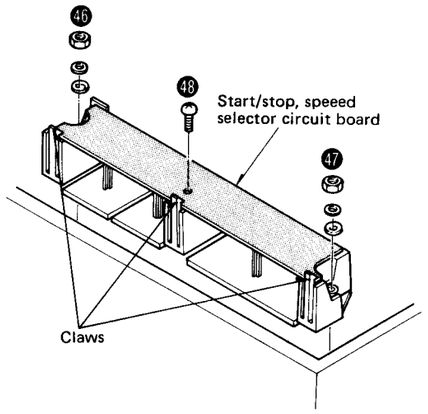


Fig. 14

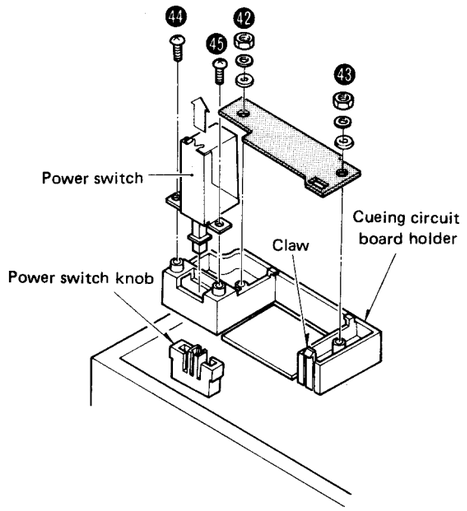


Fig. 13

- **How to remove the power switch and cueing circuit board**

1. Remove the bottom board (**Refer to "How to remove the bottom board"**).
2. Remove the 2 cueing circuit board holder nuts (**Fig. 13 :** ㊷ , ㊸) and the cueing circuit board holder.
3. Release the claw and remove the cueing circuit board.
4. Remove the power switch knob.
5. Remove the 2 power switch setscrews (**Fig. 13 :** ㊹ , ㊺) and the power switch in the direction of the arrow.

- **How to remove the start/stop, speed selector circuit board.**

1. Remove the 2 start/stop, speed selector circuit board holder nuts (**Fig. 14 :** ㊻ , ㊼) and the circuit board setscrew (**Fig. 14 :** ㊽).
2. Release the 3 claws and remove the circuit board.

- **How to remove the counter weight (Fig. 15)**

1. Completely loosen the adjustment ring and pull out the counter weight, and then counter weight can be removed.
2. When set the counter weight, insert the counter weight into the rear shaft cylinder by aligning the guide plate located at the bottom of the counter weight to the slit between rear shaft cylinder and adjusting ring.

*When the counter weight is removed, be sure to adjust.

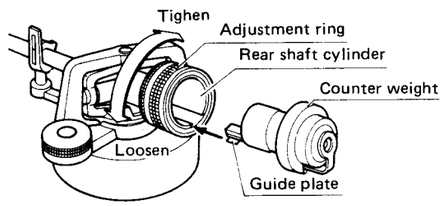


Fig. 15

■ TROUBLE SHOOTING

- **Conditions of the set**

Case 1: Refer to Fig. 16. (Check each part in stop mode.)

1) Remove the turntable mat and turntable platter.
(2) Remove the cabinet cover.
(3) Push the power switch and check each part.

Case 2: Refer to Fig. 17. (Checking each part in rotating mode.)

(1) Remove the turntable mat and turntable platter.
(2) Remove the cabinet cover.
(3) Insert the tester lead wire from the bottom of the set and connect it to the part to be checked.
(4) Connect the ground terminal of the tester to the GND terminal of the phono cable.
(5) Put on the turntable platter.
(6) Push the power switch and start button.

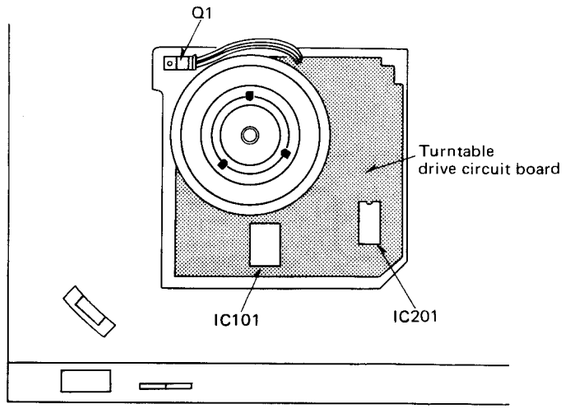


Fig. 16

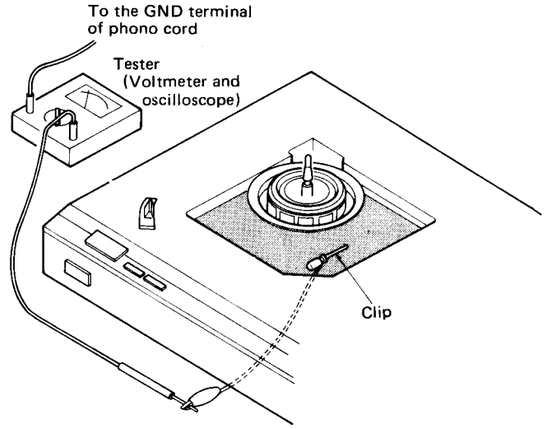


Fig. 17

1. Turntable platter does not rotate

*In the table, "stop mode" is the initial state with power turned "on", and "start mode" is the state with S/S switch depressed.

	Probably defective circuit	Check point	Possible cause
1	**Power supply circuit**	DC voltage of Q1 (emitter) 21V	S601, T1, D1, Q1 ~ 3
2	**Turntable control circuit**	DC voltage of IC201 Pin No. / Stop / Start ⑲ / 7.0V / 7V, S/S pulse ⑳ / 5.9V / 0.3V ㉑ / 0.2V / 2.8V	S303 IC201
3	**Turntable drive circuit**	DC voltage and waveform of IC101 Pin No. / Stop / Start ① / 2.9V / 2.9V ② / 2.0V / 13.0V ㉒ / 0.2V / 2.8V ㉔ / 2.0V / 2.0V ⑪ ⑬ ⑮ / 20μs, 1.4V, 15V, 0	IC101 Drive coil

2. Defecti
*In the t

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3. Cueing

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4. Auto st

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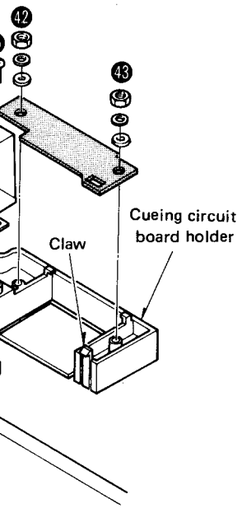

. 13

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(Fig. 13 : ㊷, ㊸) and the

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: ㊹, ㊺) and the power

tor circuit board.
oard holder nuts (Fig. 14 :
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Counter weight
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■ TROUBLE SHOOTING

• Conditions of the set

Case 1: Refer to Fig. 16. (Check each part in stop mode.)

1) Remove the turntable mat and turntable platter.
(2) Remove the cabinet cover.
(3) Push the power switch and check each part.

Case 2: Refer to Fig. 17. (Checking each part in rotating mode.)

(1) Remove the turntable mat and turntable platter.
(2) Remove the cabinet cover.
(3) Insert the tester lead wire from the bottom of the set and connect it to the part to be checked.
(4) Connect the ground terminal of the tester to the GND terminal of the phono cable.
(5) Put on the turntable platter.
(6) Push the power switch and start button.

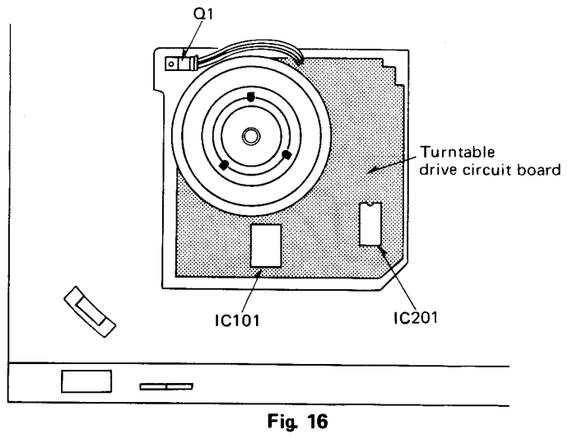


Fig. 16

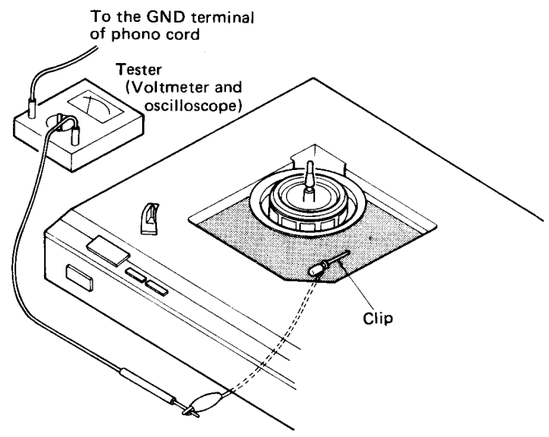


Fig. 17

1. Turntable platter does not rotate

*In the table, "stop mode" is the initial state with power turned "on", and "start mode" is the state with S/S switch depressed.

	Probably defective circuit	Check point	Possible cause
1	**Power supply circuit**	DC voltage of Q1 (emitter) 21V	S601, T1, D1, Q1 ~ 3
2	**Turntable control circuit**	DC voltage of IC201 Pin No. ⑲: Stop 7.0V, Start 7V (S/S pulse) Pin No. ⑳: Stop 5.9V, Start 0.3V Pin No. ㉑: Stop 0.2V, Start 2.8V	S303 IC201
3	**Turntable drive circuit**	DC voltage and waveform of IC101 Pin No. ①: Stop 2.9V, Start 2.9V Pin No. ②: Stop 2.0V, Start 13.0V Pin No. ㉒: Stop 0.2V, Start 2.8V Pin No. ㉔: Stop 2.0V, Start 2.0V ⑪, ⑬, ⑮: 20μs, 1.4V, 15V, 0	IC101 Drive coil

2. Defective rotation (runaway, unstable)

*In the table, the waveform is measured in rotating mode.

	Probably defective circuit	Check point	Possible cause
1	**FG amp. circuit**	Waveform of terminal ㉓ of IC201 20ms (33) 15ms (45) 0.8V, 3V, 0	FG coil Q203 IC201
2	**Turntable contorl circuit**	Waveform of terminal ⑬, ⑭ of IC201 8V, 5V, 0 5V, 0	IC201 IC101

3. Cueing operation failure

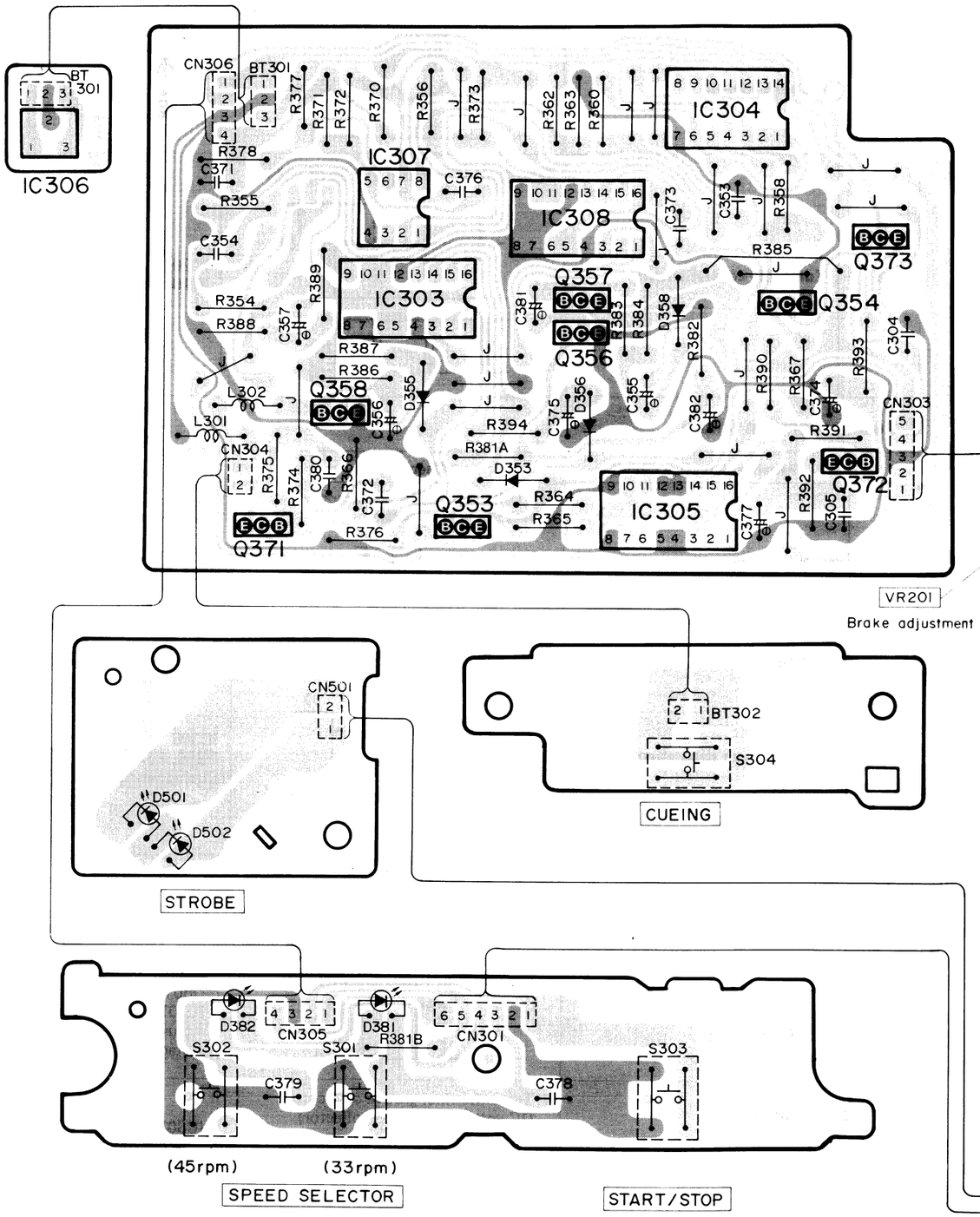
	Probably defective circuit	Check point	Possible cause
1	**Cueing circuit**	DC voltage of Q358 (collector) (Press the cueing switch) 12V Cueing command pulse	S304 Q358
2	**Cueing plunger drive circuit**	DC voltage of Q357 (collector) up, up, 21V, 16V, 0, down	IC303 Q356, 357 Cueing plunger

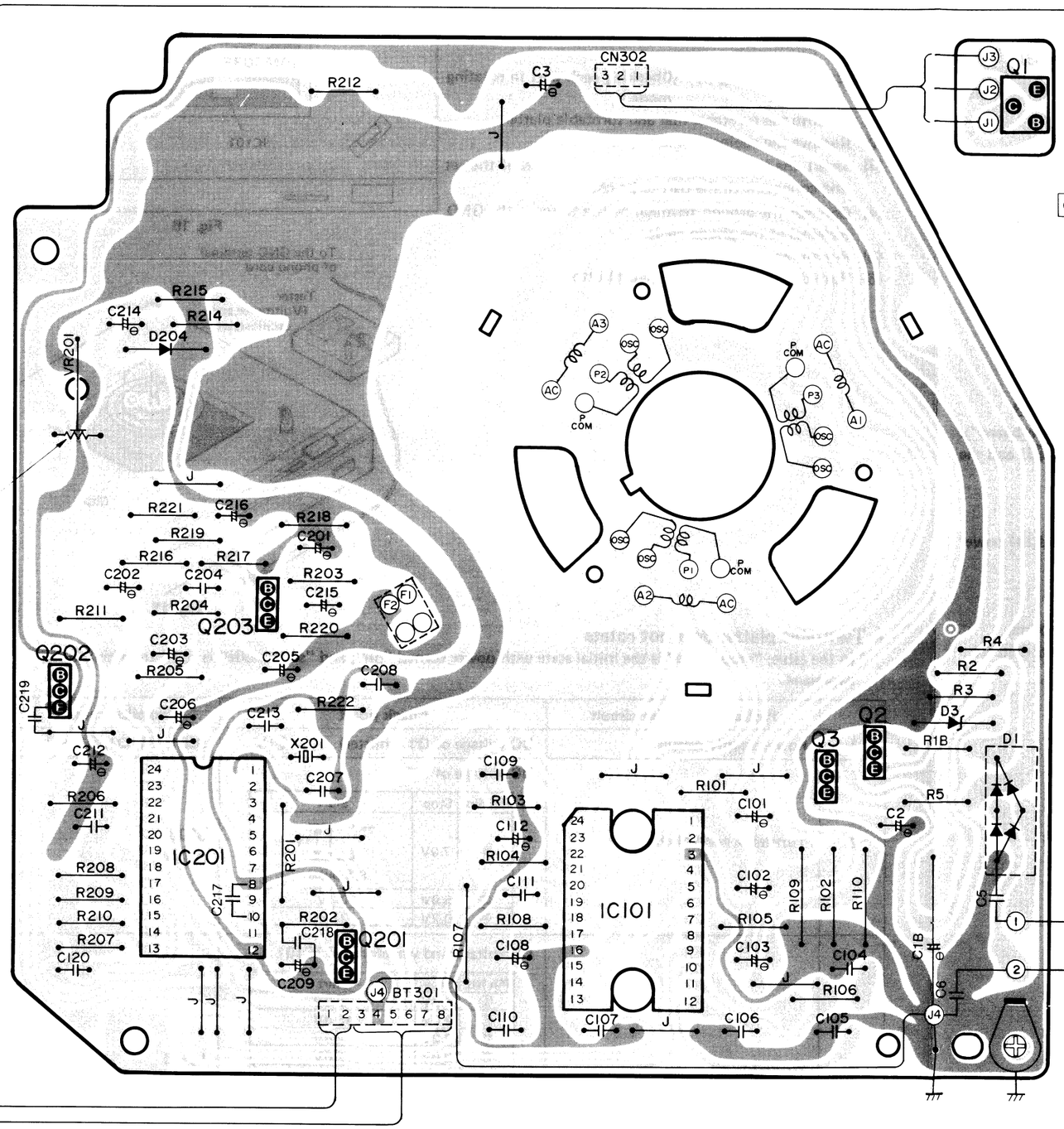
4. Auto stop and lift-up failure

	Probably defective circuit	Check point	Possible cause
1	**End detection circuit**	• Trace a 1mm pitch record. Waveform of IC307 (① pin) 12V, 0	PC601 Q601 IC307 Adjustment of output voltage
2	**Stop command circuit**	• Trace the final groove of record. DC voltage of Q373 (collector) 7V, 0 (Stop command pulse)	IC303, 304 306 ~ 308 Q353, 354 371 ~ 373
3	**Cueing command circuit**	Refer to **"Cueing operation failure"** previously mentioned.	

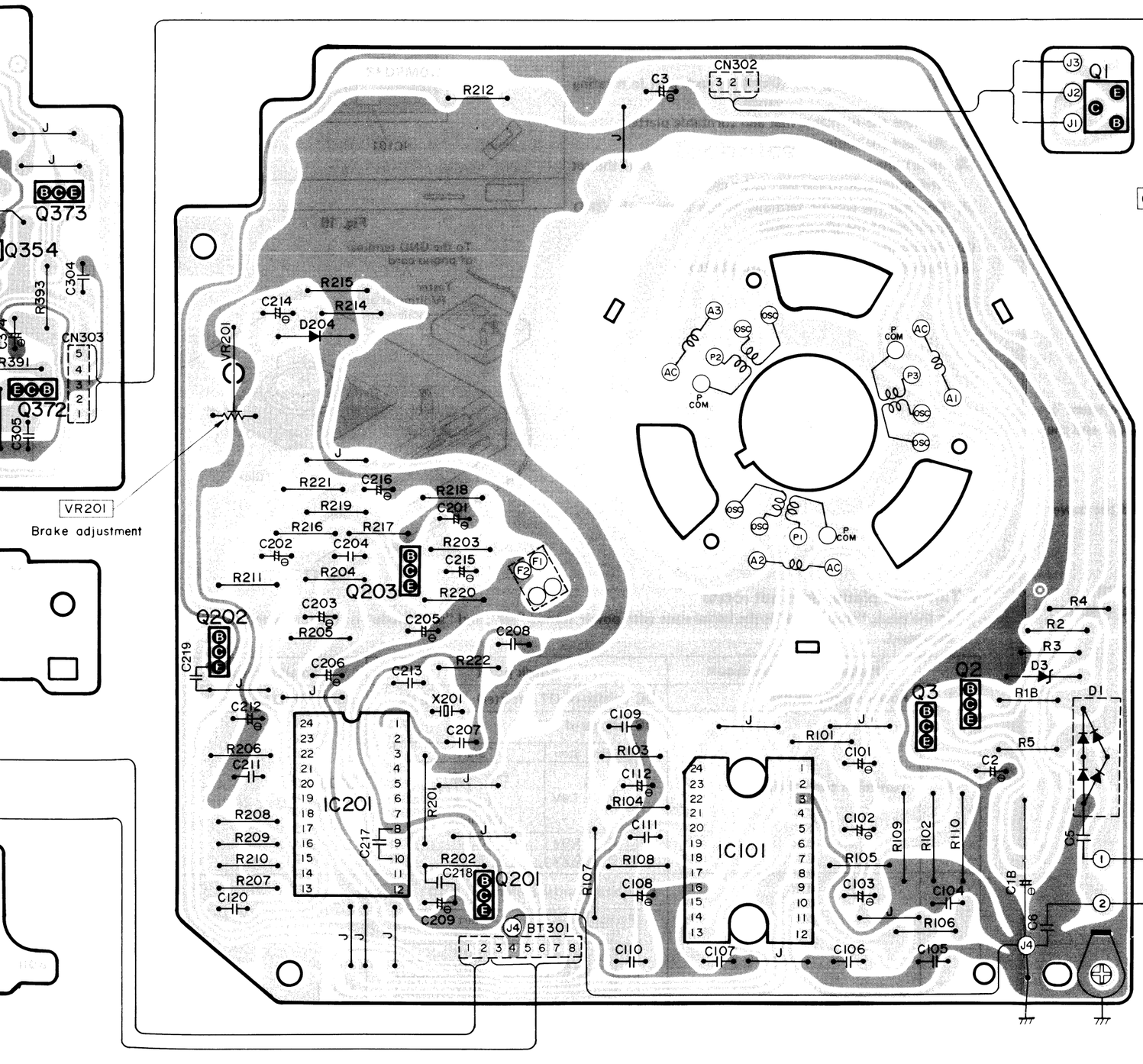
■ CIRCUIT BOARD AND WIRING CONNECTION DIAGRAM

Ground (Earth) lines





Ground (Earth) lines



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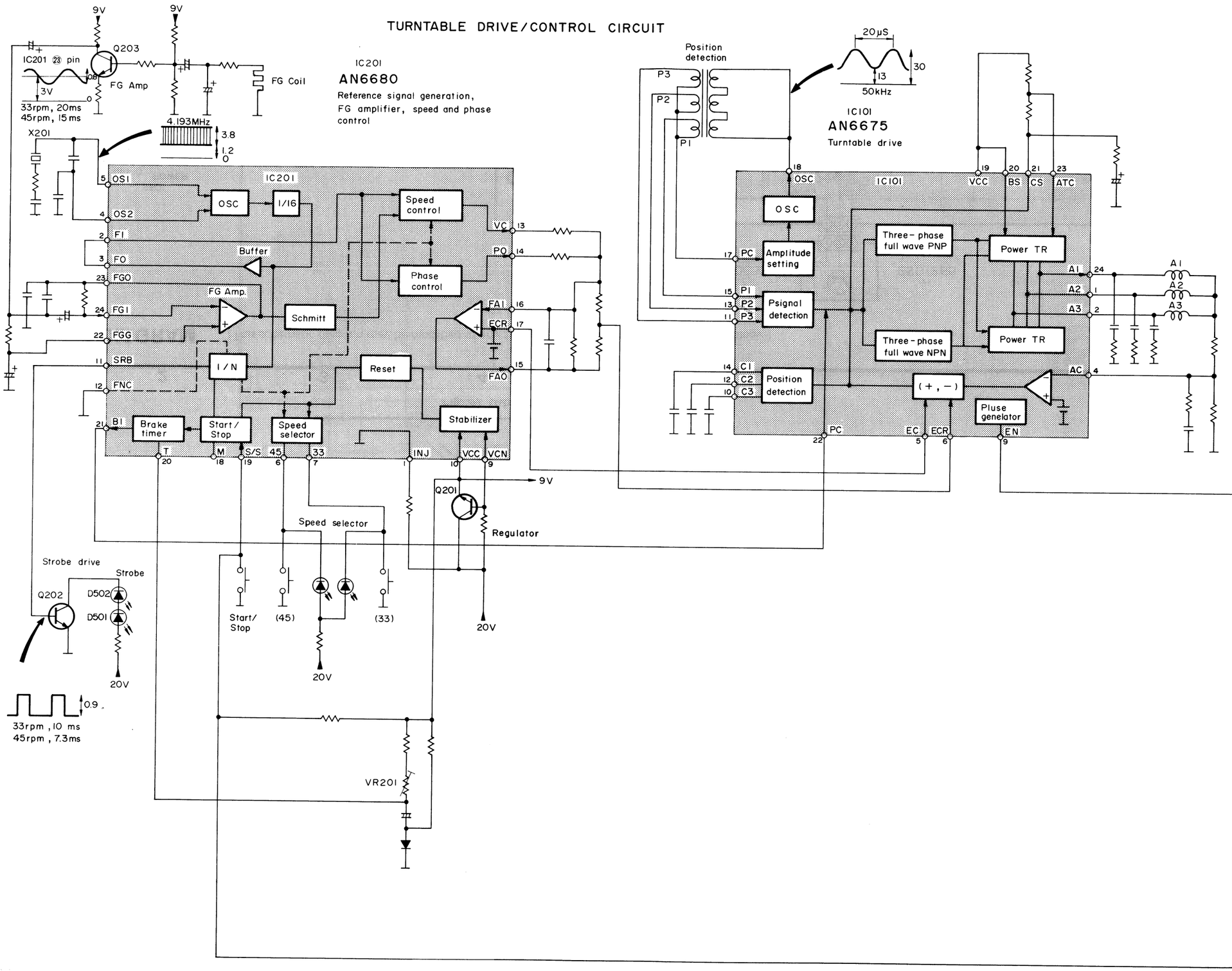
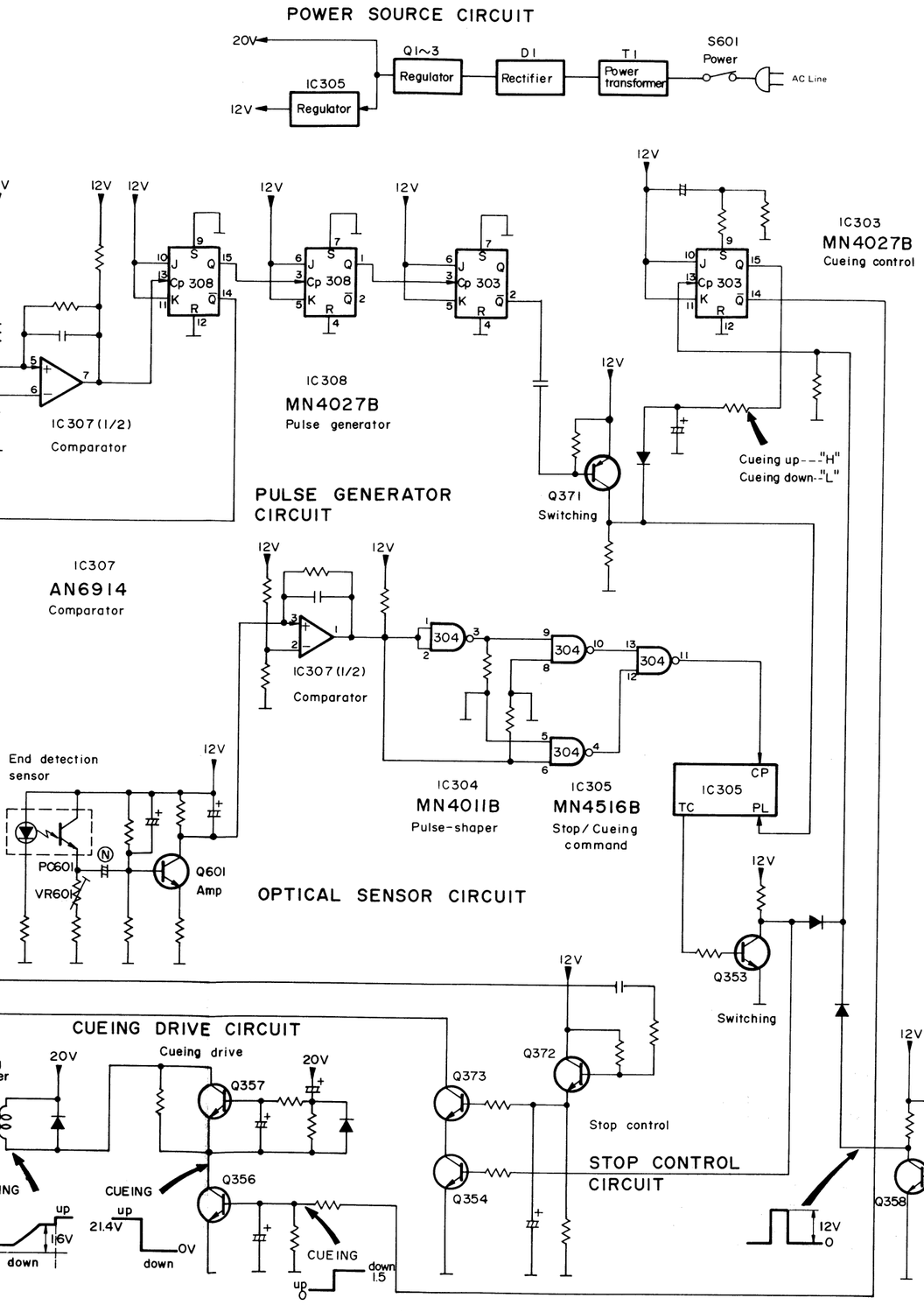
■ BLOCK DIAGRAM





■ REPLACEMENT PARTS LIST (Electrical Parts)

Notes:
1. Part numbers are indicated on most mechanical parts. Please use this part number for parts orders.
2. Important safety notice: Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.
3. Bracketed indications in Ref. No. columns specify the area. Parts without these indications can be used for all areas.
4. The "Ⓢ" mark is service standard parts and may differ from production parts.

Areas

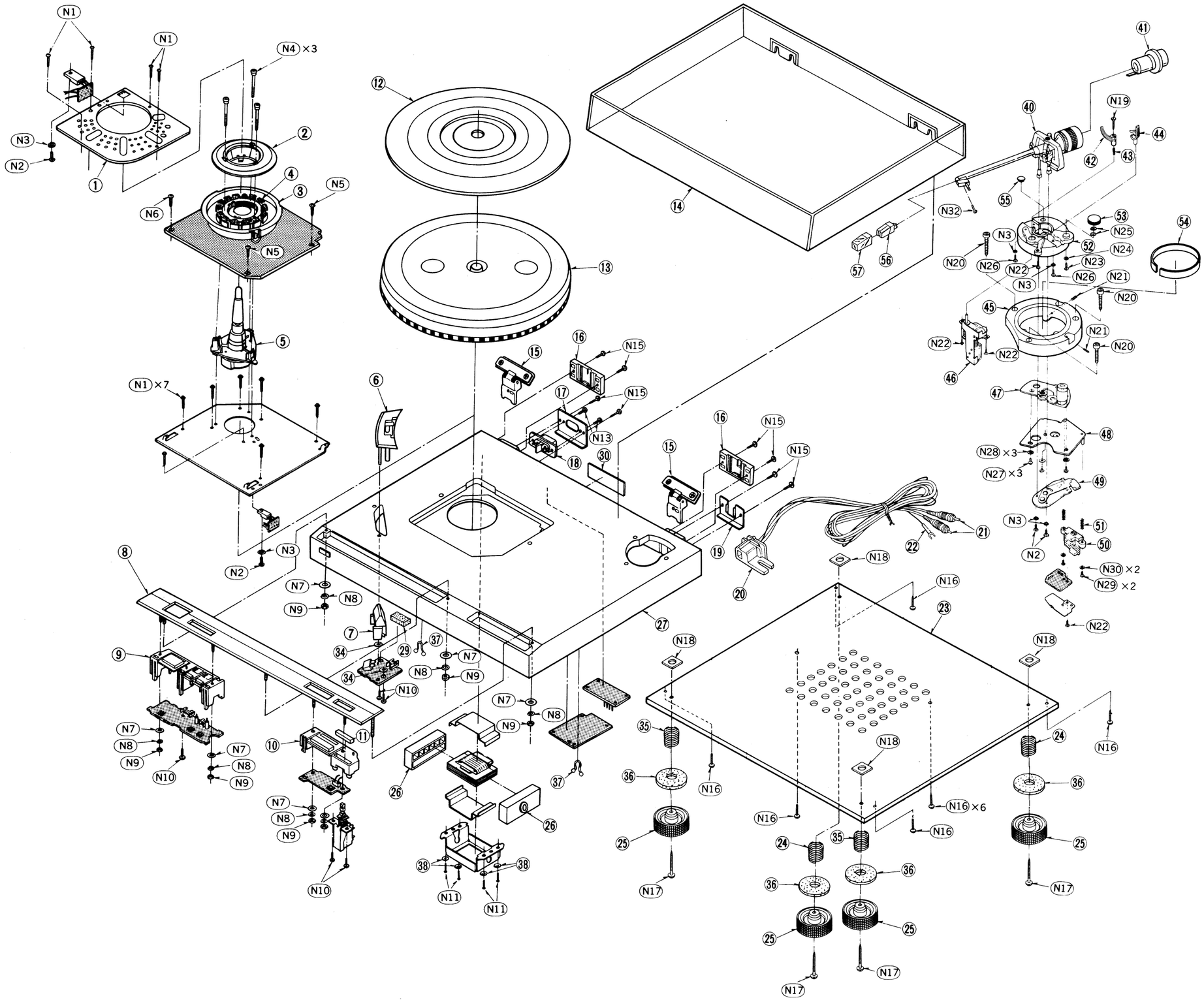
* [E] is available in Switzerland and Scandinavia.
* [EK] is available in United Kingdom.
* [EG] is available in F.R. Germeny.
* [EB] is available inBelgium.
* [EH] is available in Holland.
* [EF] is available in France.
* [Ei] is available in Italy.
* [EC] is avaiable in Czechoslovakia.
* [XL] is available in Australia.
* [XA] is abailable in Southeast Asia, Oceania, Africa, Middle Near East and Central South America.
* [XM] is available in Central South America.

Ref. No.	Part No.	Description
INTEGRATED CIRCUITS		
IC101	AN6675	Turntable Drive
IC201	AN6680	Control
IC304	MN4011B	NAND Gate
IC303,308	MN4027B	JK Flip-Flop
IC305	MN4516B	4-Bit Binary Counter
IC306	AN78M12	Regulator, +12V
IC307	AN6914	Operational Amp.
TRANSISTORS		
Q1	2SD1265	Regulator
Q2,3	2SD637	Regulator
Q201	2SC1846-R	Regulator
Q202	2SD637	Strobe Driver
Q203 Ⓢ	2SC1328-T	FG Amp.
Q353,354,358	2SD636	Switching
Q356,357 Ⓢ	2SD893A	Cueing Drive

Ref. No.	Part No.	Description
TRANSISTORS		
Q371	2SB641	Switching
Q372	2SB643	Stop Control
Q373	2SD636	Stop Control
Q601 Ⓢ	2SC1684-Q	Amp.
DIODES		
D1 ⚠	SVDSIRBA20Z	Rectifier
D2 Ⓢ	MA1051	5.1V Zener
D204 Ⓢ	MA162A	Switching
D353,355,356,358 Ⓢ	MA162A	Switching
D381,382	SVDSR-605C	Speed,Reset Indicator
D501,502	SVDEBR5505S	Strobe Indicator
D601 Ⓢ	MA162A	Pulse Killer
VARIABLE RESISTORS		
VR201 Ⓢ	EVTS3MA00B54	Brake Adjuster, 50kΩ(B)
VR601	EVN60AA00B15	Output Voltage Adjuster,100kΩ(B)

Ref. No.	Part No.	Description
PHOTO INTERRUPTOR		
PC601	ON1108	End Detection
SWITCHES		
S301~304	EVQQJ104K	Start/Stop,Speed Selector,Cueing
S601 ⚠	ESB823V	Power
S602 ⚠	SFDSHXW01317	Voltage Selector
CRYSTAL		
X201	SVQMS4193	Crystal, 4.193MHz
COIL		
L301,302	SP0305-1R2K	Choke,1.2μH
POWER TRANSFORMER		
T1 ⚠	SLT66DTE13E	Power Source
FUSE		
F1 ⚠	XBA2C025TR0	T250mA,250V

■ EXPLODED VIEW



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■ REPLAC

Notes:
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4. The "Ⓢ" ma
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5. The parenthe
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Ref. No.	Part No.
CABINET and CHASSIS PA	
1	SFUPM01N09
2	SFMGQ20-01
3	SFMZ172-01E
4	SFMG520-31A
5	SFMZM01N01A
6	SFUMM01N01
7	SFUMQ11N09
8	SFKKM01N01A
9	SFUMM01N03E
10	SFUMM01N04E
11	SFKTM01N03
12	SFTGM01N01
13	SFTEM01N01Z
14	SFADM01N01E
15	SFATM01N01A
16	SFUM170-07
17	SFUPM01N07
18 △ (XL,XA,XM)	SFDJHSC0491
18 △ (other areas)	SFDJHSC0498
19	SFUPM01N08
20	SFUMQ34N10
21	SFDHM01N01
22	SFEL028-01E
23	SFAUM01N01
24	SFQAM01N01
25	SFGAM01N01E
26	SFGCM01N01
27	SFACN01N01R
29	SFGZM01N03
30 (E,EC)	SFNNM01S01
30 (EK,XL)	SFNNM01G01
30 (XA,XM)	SFNNM01X01
30 (other areas)	SFNNM01R01
34	SFGZM01N05
35	SFQAM01N02
36	SFUZM01N02
37	SFUMM01N07
38	SFGCM01N02

22

■ REPLACEMENT PARTS LIST (Mechanical Parts)

Notes:
1. Part numbers are indicated on most mechanical parts. Please use this part number for parts orders.
2. Important safety notice: Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.
3. Bracketed indications in Ref. No. columns specify the area. Parts without these indications can be used for all areas.
4. The "Ⓢ" mark is service standard parts and may differ from production parts.
5. The parenthesized numbers in the columns of description stand for the quantity per set.

Areas

* [E] is available in Switzerland and Scandinavia.
* [EK] is available in United Kingdom.
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* [EF] is available in France.
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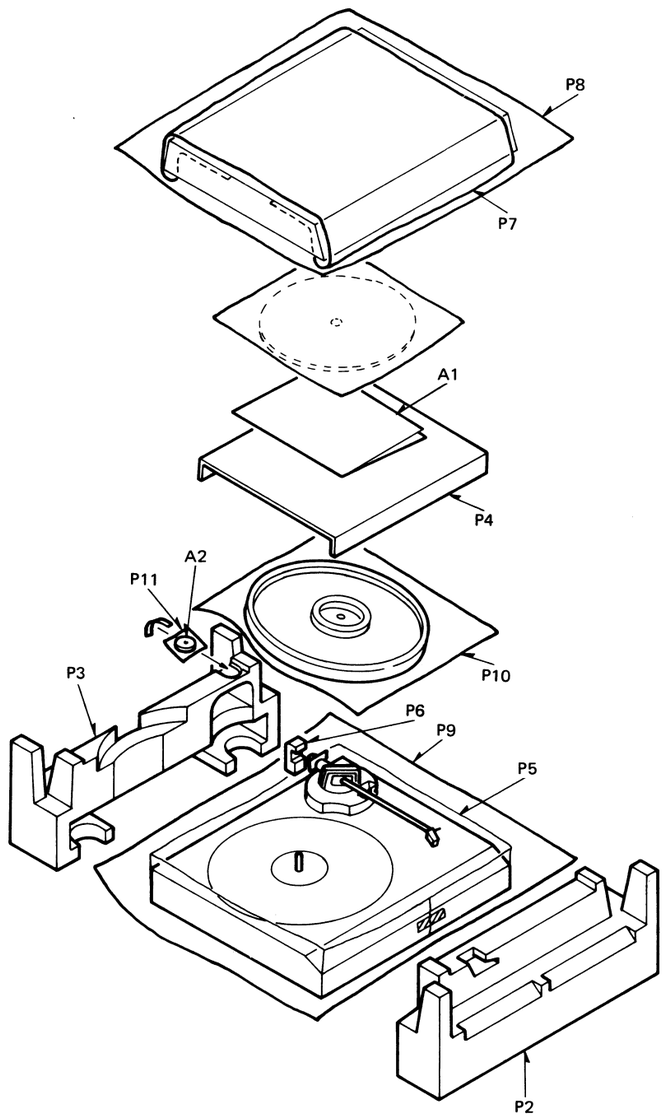
* [EC] is avaiable in Czechoslovakia.
* [XL] is available in Australia.
* [XA] is abailable in Southeast Asia, Oceania, Africa, Middle Near East and Central South America.
* [XM] is available in Central South America.

Ref. No.	Part No.	Description	
CABINET and CHASSIS PARTS			
1	SFUPM01N09	Cover,Cabinet	(1)
2	SFMGQ20-01	Cover,Drive Coil	(1)
3	SFMZ172-01E	FG Coil	(1)
4	SFMG520-31A	Drive Coil	(1)
5	SFMZM01N01A	Shaft Ass'y	(1)
6	SFUMM01N01	Guide, Strobe	(1)
7	SFUMQ11N09	Cover,Strobe	(1)
8	SFKKM01N01A	Ornament Plate	(1)
9	SFUMM01N03E	Button Ass'y	(1)
10	SFUMM01N04E	Button Ass'y	(1)
11	SFKTM01N03	Button,Power	(1)
12	SFTGM01N01	Turntable Mat	(1)
13	SFTEM01N01Z	Turntable Platter	(1)
14	SFADM01N01E	Dust Cover	(1)
15	SFATM01N01A	Hinge	(2)
16	SFUM170-07	Case, Hinge	(2)
17	SFUPM01N07	Bracket,AC Jack	(1)
18 ⚠ (XL,XA,XM)	SFDJHSC0491	Jack,AC IN	(1)
18 ⚠ (other areas)	SFDJHSC0498	Jack,AC IN	(1)
19	SFUPM01N08	Bracket,Phono Cord	(1)
20	SFUMQ34N10	Clamper,Phono Cord	(1)
21	SFDHM01N01	Phono Cord	(1)
22	SFEL028-01E	Ground Wire	(1)
23	SFAUM01N01	Botton Board	(1)
24	SFQAM01N01	Spring(A),Insulator	(2)
25	SFGAM01N01E	Insulator	(4)
26	SFGCM01N01	Rubber,Power Transformer	(2)
27	SFACN01N01R	Cabinet	(1)
29	SFGZM01N03	Spacer	(1)
30 (E,EC)	SFNNM01S01	Name Plate	(1)
30 (EK,XL)	SFNNM01G01	Name Plate	(1)
30 (XA,XM)	SFNNM01X01	Name Plate	(1)
30 (other areas)	SFNNM01R01	Name Plate	(1)
34	SFGZM01N05	Spacer,Strobe Cover	(2)
35	SFQAM01N02	Spring(B),Insulator	(2)
36	SFUZM01N02	Cushion,Insulator	(4)
37	SFUMM01N07	Clamper	(2)
38	SFGCM01N02	Rubber Cushion	(4)

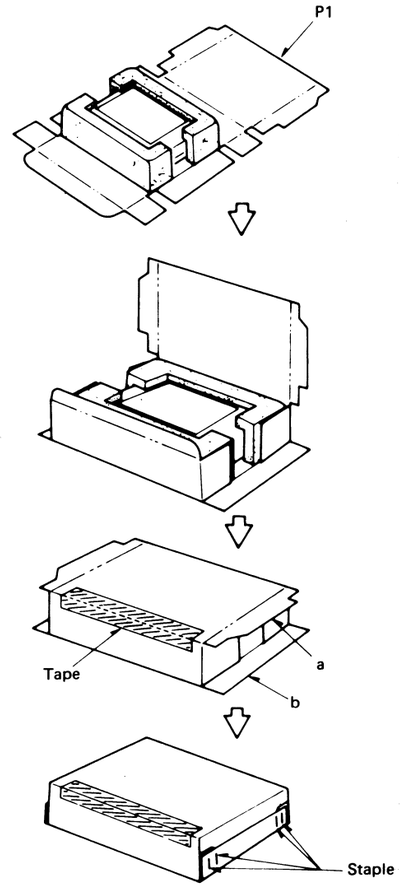
Ref. No.	Part No.	Description	
TONEARM PARTS			
40	SFPAM0M102R	Tonearm Ass'y	(1)
41	SFPWG0M102A	Counter Weight	(1)
42	SFPRT0M102E	Lift Ass'y	(1)
43	SFQA829-03	Spring	(1)
44	SFPRT0M101E	Arm Rest	(1)
45	SFPKD0M102	Base	(1)
46	SFPAB0M106Z	Lift Base Ass'y	(1)
47	SFPAB0M101A	PU Base Ass'y	(1)
48	SFPAB0M102E	Sensor Plate Ass'y	(1)
49	SFPAB0M104A	PU Fixing Plate Ass'y	(1)
50	SFPZB0M103	Holder, Sensor P.C.B.	(1)
51	SFQA172-52	Spring,Sensor Holder	(2)
52	SFPKD0M101E	Arm Base	(1)
53	SFPAB17206	Knob, Anti-Skating Control	(1)
54	SFPZB0M109	Sheet, Arm Base	(1)
55	SFGK170-01	Rubber Cap	(1)
56	EPC-P33AK	Cartridge	(1)
	EPS-33ES	Stylus	(1)
57	SFCNC03301	Cover,Stylus	(1)
SCREWS,WASHERS&NUTS			
N1	XTWS3+14QFZ	Screw	(1)
N2 Ⓢ	XSN3+6S	Screw	(4)
N3 Ⓢ	XWA3B	Washer	(6)
N4	SFXGQ20-02	Screw	(3)
N5 Ⓢ	XTV3+6BFN	Screw	(2)
N6	XYE3+EJ8	Screw	(1)
N7 Ⓢ	XWE3A8BW	Washer	(7)
N8 Ⓢ	XWA3B	Washer	(7)
N9 Ⓢ	XNG3ES	Nut	(7)
N10 Ⓢ	XTV3+8BFN	Screw	(6)
N11	SFXG066N01	Screw	(4)
N12	SFGZM01N05	Washer	(2)
N13	XTV4+6GFZ	Screw	(2)
N15	XTWS3+20QFZ	Screw	(8)
N16	XTWS3+25QFZ	Screw	(6)
N17 Ⓢ	XTV3+14BFN	Screw	(4)
N18	XNK3	Nut	(4)
N19	SFPEV0M101	Screw	(1)
N20	SFXGM01N02	Screw	(3)
N21	XXE4D12FNS	Screw	(2)
N22 Ⓢ	XTN3+6B	Screw	(4)
N23	XTW26+5E	Screw	(1)
N24	SFPEW17201	Washer	(1)
N25	SFXW701-02	Washer	(2)
N26 Ⓢ	XSN3+10S	Screw	(2)
N27 Ⓢ	XTN3+10B	Screw	(3)

Ref. No.	Part No.	Description	
SCREWS,WASHERS&NUTS			
N28 Ⓢ	XWG3	Washer	(3)
N29 Ⓢ	XSN26+6	Screw	(2)
N30 Ⓢ	XWE26BW	Washer	(2)
N32	SFPEV0P301	Screw	(1)
ACCESSORIES			
A1 (EG)	SFNUM01R01	Instruction Book	(1)
A1 (EK)	SFNUM01G01	Instruction Book	(1)
A1 (EF,EI XA,XL XM)	SFNUM01R01	Instruction Book	(1)
A1 (other areas)	SFNUM01S01E	Instruction Book	(1)
A2	SFWE212-01	45 Adaptor	(1)
A3 (EK) ⚠	SFDAC05G02	AC Cord	(1)
A3 (XL) ⚠	SFDAC05L01	AC Cord	(1)
A3 ⚠ (XA,XM)	SFDAC05X02	AC Cord	(1)
A3 ⚠ (other areas)	SFDAC05E02	AC Cord	(1)
A4 only ⚠ (XA,XM)	SFDKI19118	2pin Plug	(1)
PACKING PARTS			
P1 (EF) only	SFHPM01C01	Carton Box	(1)
P1 (other areas)	SFHPM01M01	Carton Box	(1)
P2	SFHHM01N01	Pad,Unit (Front)	(1)
P3	SFHHM01N02	Pad,Unit (Rear)	(1)
P4	SFHDM01N01	Pad,Turntable	(1)
P5	SFHZM01N02	Pad,Unit (Side)	(1)
P6	SFHZM01M01	Pad,Blance Weight	(1)
P7	SFHZD03M01	Cover Sheet, Dust Cover	(1)
P8	SFYH60×60	Polyethylene Bag, Dust Cover	(1)
P9	SFYF60A80	Polyethylene Bag,Unit	(1)
P10	SFYH40×45	Polythylene Bag, Turntable	(1)
P11	SFYF09A15	Polyethylene Bag, 45 Adaptor	(1)

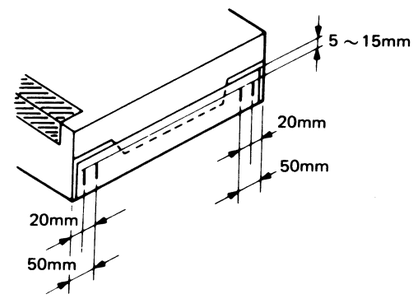
■ PACKING



1. Plase the unit (with cushions attached) as illustrated.
2. Fold the flaps according to the line marks.
3. Seal the top with adhesive tape.
   * Use gum tape or adhesive cloth tape of 50mm wide at least.
4. For the edges, first fold the flap "a" and then flap "b", and staple. Remember to staple only flap "b". (Use 15 or 16mm staple)



* Stapling positions are shown below.



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■ MEASUREMENTS AND ADJUSTMENT

• Adjustment of arm-lift height (Figs. 18 and 19)

The arm-lift height (distance between the stylus tip and record surface when the tonearm is raised) has been adjusted at the factory before shipping to approximately 5 – 7 mm.

If the clearance becomes too narrow or too wide, turn the adjustment screw clockwise or counterclockwise while pushing the arm lift down.

Clockwise rotation

—distance between the record and stylus tip is decreased.

Counterclockwise rotation

—distance between the record and stylus tip is increased.

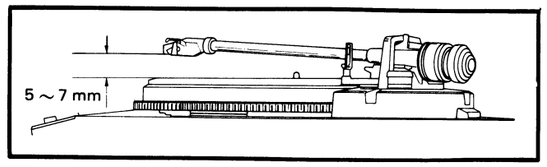


Fig. 18 (Abb. 18)

• Adjustment of automatic lift-up position (Fig. 20)

1. Put the stylus protector on the cartridge.
2. Remove the rubber cap.
3. Release the arm clamp and move the tonearm toward the center of the record.
   The auto lift-up adjustment screw will appear.
4. Turn the screw with a screwdrive, clockwise or counterclockwise as necessary.

If the tonearm tends to lift up from the record surface before the play has finished.

—turn counterclockwise

If the tonearm fails to lift up after the final groove.

—turn clockwise.

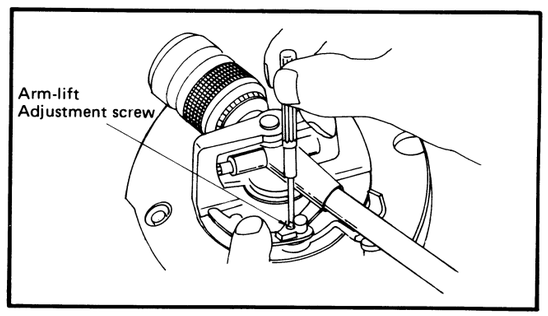


Fig. 19 (Abb. 19)

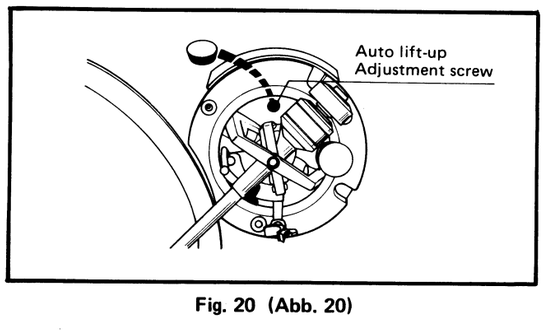


Fig. 20 (Abb. 20)

• Adjustment of brake

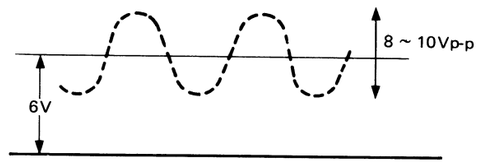
1. Turn power switch "on" and set the speed selector to "33 r.p.m."
2. Depress the stop button in rotating mode and adjust VR201 so that the turntable platter stops within a range of 90° ~ 180°. **(See Fig. 21.)**

• Adjustment of slit plate gap

1. Adjust the 2 adjust screws so that the gap between the slit plate and photo coupler is 1.0 ± 0.2 mm. **(See Fig. 22)**
2. Make sure that the slit plate is parallel to the coupler.

• Adjustment of output voltage (Fig. 22)

1. Remove the bottom board and connect an oscilloscope to pin 2 of sensor board BT601.
2. Let it trace a 1 mm pitch record at 33 r.p.m. and then adjust VR601 so that the waveform is as shown below in the position within 65 mm from the center of the record.



• Adjustment points

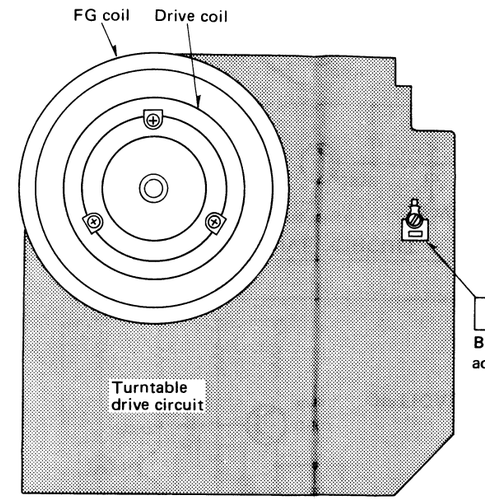
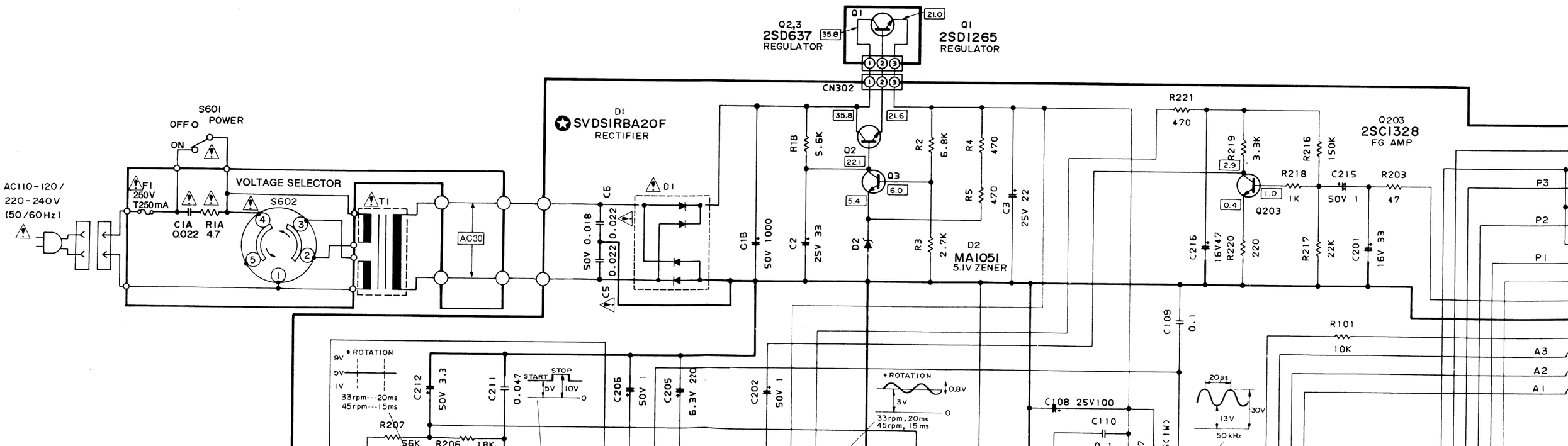


Fig. 21 (Abb. 21)

■ SCHEMATIC DIAGRAM

(This schematic diagram may be modified at any time with the development of new technology.)



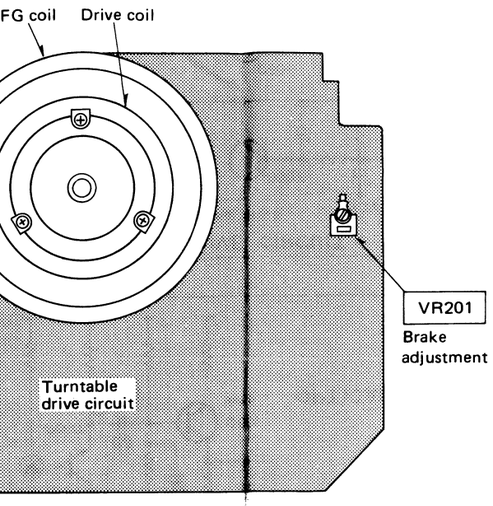


Fig. 21 (Abb. 21)

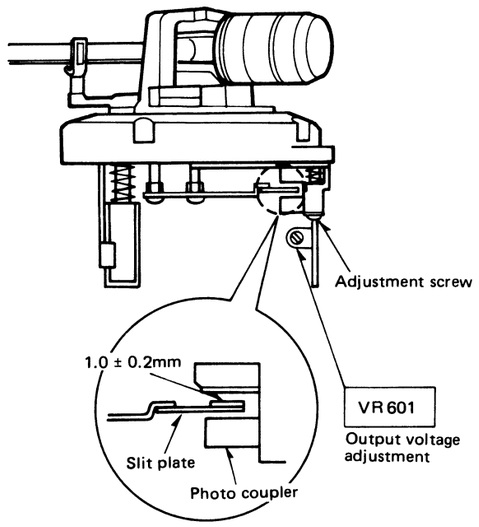
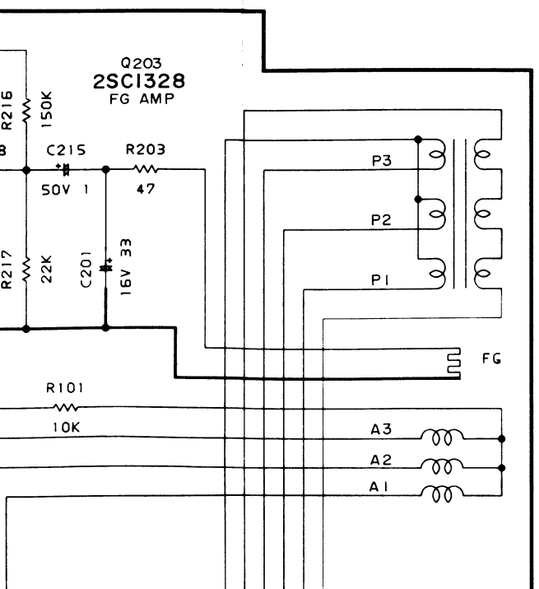


Fig. 22 (Abb. 22)

9 10 11 12 13 14



■ RESISTORS AND CAPACITORS

Notes: 1. Part numbers are indicated on most mechanical parts. Please use this part number for parts orders.
2. Important safety notice: Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.
3. The "Ⓢ" is mark is service standard parts and may differ from production parts.
4. The unit of resistance is Ω(ohm). K = 1000Ω, M = 1000kΩ
5. The unit of capacitance is μF (microfarad) P = 10^{-6} μF

Numbering System of Resistor

Example

ERD	25	F	J	101
Type	Wattage	Shape	Tolearance	Value
ERX	2	AN	J	2R2
Type	Wattage	Shape	Tolerance	Value

Resistor type	Wattage	Tolerance
ERD: Carbon	25 : 1/4W	F : ±1%
ERG: Metal Oxide	50 : 1/2W	J : ±5%
ERO: Metal Film	1A : 1W	
ERX: Metal Film	2A : 2W	

Numbering System of Capacitor

Example

ECKD	1H	102	Z	F
Type	Voltage	Value	Tolerance	Peculiarity
ECEA	50	M	R47	R
Type	Voltage	Reculiarity use	Value	Special use

Capacitor Type	Voltage	Tolearnce
ECEA : Electrolytic	OJ : 6.3V	J : ±5%
ECEB : Electrolytic	1C : 16V	K : ±5%
ECEA...N : Non Polar	1E : 25V	M : ±20%
Electrolytic	1V : 35V	Z : +80%,–20%
ECCD : Ceramic	1H : 50V	
ECQM : Polyester	ECQP1 : 100V	
ECQP : Polypropylene	ECQU1A : 125V	
ECQU : Polyester		
ECKD : Ceramic		

Ref. No.	Part No.	Value
RESISTORS		
R1A ⚠Ⓢ	ERD50FJ4R7	4.7
R1B Ⓢ	ERD25FJ562	5.6K
R2 Ⓢ	EDR25FJ682	6.8K
R3 Ⓢ	ERD25FJ272	2.7K
R4,5 Ⓢ	EDR25FJ471	470
R101 Ⓢ	EDR25FJ103	10K
R102 Ⓢ	ERX1ANJ4R7	4.7
R103 Ⓢ	EDR25FJ472	4.7K
R104 Ⓢ	EDR25TJ473	47K
R105 Ⓢ	ERD25FJ103	10K
R106 Ⓢ	ERD25FJ150	15
R107 Ⓢ	ERX1ANJ1R5	1.5
R108 Ⓢ	ERD25FJ103	10K
R109,110 Ⓢ	ERX1ANJ4R7	4.7
R201 Ⓢ	ERG1ANJ561	560
R202 Ⓢ	ERD25FJ103	10K
R203 Ⓢ	ERD25FJ470	47
R204 Ⓢ	ERD25FJ272	2.7K

Ref. No.	Part No.	Value
RESISTORS		
R205 Ⓢ	ERD25TJ124	120K
R206 Ⓢ	ERD25TJ183	18K
R207 Ⓢ	ERD25TJ563	56K
R208 Ⓢ	ERD25TJ224	220K
R209 Ⓢ	ERD25TJ104	100K
R210 Ⓢ	ERD25FJ822	8.2K
R211 Ⓢ	ERD25FJ103	10K
R212 Ⓢ	ERD25FJ271	270
R214 Ⓢ	ERD25TJ223	22K
R215 Ⓢ	ERD25FJ472	4.7K
R216 Ⓢ	ERD25TJ154	150K
R217 Ⓢ	ERD25TJ223	22K
R218 Ⓢ	ERD25FJ102	1K
R219 Ⓢ	ERD25FJ332	3.3K
R220 Ⓢ	ERD25FJ221	220
R221 Ⓢ	ERD25FJ471	470
R222 Ⓢ	ERD25FJ391	390
R354 Ⓢ	ERD25FJ104	100K

Ref. No.	Part No.	Value
RESISTORS		
R355 Ⓢ	ERD25TJ684	680K
R356 Ⓢ	ERD25FJ103	10K
R358 Ⓢ	ERD25TJ473	47K
R360 Ⓢ	ERD25TJ473	47K
R362,363 Ⓢ	ERD25TJ154	150K
R364 Ⓢ	ERD25TJ153	15K
R365 Ⓢ	ERD25FJ472	4.7K
R366,367 Ⓢ	ERD25TJ473	47K
R370 Ⓢ	ERD25TJ273	27K
R371 Ⓢ	ERD25TJ104	100K
R372 Ⓢ	ERD25TJ474	470K
R373,374 Ⓢ	ERD25FJ103	10K
R375 Ⓢ	ERD25TJ473	47K
R376 Ⓢ	ERD25TJ104	100K
R377,378 Ⓢ	ERD25TJ154	150K
R381A Ⓢ	ERD25TJ153	15K
R381B Ⓢ	ERD25FJ122	1.2K

Ref. No.	Part No.	Value
RESISTORS		
R382 Ⓢ	ERD25TJ823	82K
R383 Ⓢ	ERD25TJ393	39K
R384 Ⓢ	ERD25FJ472	4.7K
R385 Ⓢ	ERG2ANJ151	150
R386,387 Ⓢ	ERD25FJ472	4.7K
R388 Ⓢ	ERD25TJ154	150K
R389,390 Ⓢ	ERD25FJ103	10K
R391 Ⓢ	ERD25TJ473	47K
R392 Ⓢ	ERD25TJ393	39K
R393 Ⓢ	ERD25FJ103	10K
R394 Ⓢ	ERD25TJ153	15K
R601 Ⓢ	ERD25TJ222	2.2K
R602,603 Ⓢ	ERD25FJ561	560
R604 Ⓢ	ERD25TJ564	560K
R605 Ⓢ	ERD25TJ563	56K
R606 Ⓢ	ERD25TJ153	15K
R607 Ⓢ	ERD25FJ102	1K

Ref. No.	Part No.	Value
CAPACITORS		
C1A(XA,XM) ⚠	ECQE2A223MZ	0.022
C1A(other areas) ⚠	ECQU2A223MF	0.022
C1B	ECEB1HU102	1000
C2	ECEA1EU330	33
C3	ECEA1EU220	22
C5,6 ⚠	ECQM1223KZ	0.022
C101,102	ECEA1EU330	33
C103	ECEA1EU330	33
C104,105 Ⓢ	ECQM1H104JZ	0.1
C106,107 Ⓢ	ECQM1H104JZ	0.1
C108	ECEA1EU101	100

Ref. No.	Part No.	Value
CAPACITORS		
C109,110 Ⓢ	ECQM1H104JZ	0.1
C111 Ⓢ	ECQM1H562JZ	0.0056
C112	ECEA1HU4R7	4.7
C201	ECEA1CU330	33
C202,203	ECEA1HU010	1
C204 Ⓢ	ECQM1H473JZ	0.047
C205	ECEA0JU221	220
C206	ECEA1HU010	1
C207 Ⓢ	ECCD1H101K	100P
C208 Ⓢ	ECCD1H220K	22P
C209	ECEA1CU101	100
C210 Ⓢ	ECQM1H224JZ	0.22
C211 Ⓢ	ECQM1H473JZ	0.047

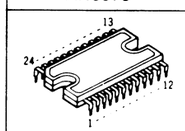
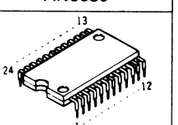
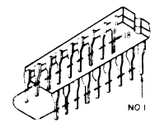
Ref. No.	Part No.	Value
CAPACITORS		
C212	ECEA1HU3R3	3.3
C213 Ⓢ	ECCD1H471K	470P
C214	ECEA1CU101	100
C215	ECEA1HU010	1
C216	ECEA1CU470	47
C217,218 Ⓢ	ECKD1H104KB	0.1
C219 Ⓢ	ECKD1H104KB	0.1
C304,305 Ⓢ	ECQM1H104JZ	0.1
C352,353 Ⓢ	ECCD1H221K	220P
C354 Ⓢ	ECCD1H330K	33P
C355	ECEA1EU331	330
C356 Ⓢ	ECEA50Z4R7	4.7
C357	ECEA1HU010	1
C371 Ⓢ	ECQM1H104JZ	0.1

Ref. No.	Part No.	Value
CAPACITORS		
C372,373 Ⓢ	ECQM1H223JZ	0.022
C374	ECEA1CU100	10
C375	ECEA1VU4R7	4.7
C376 Ⓢ	ECCD1H330K	33P
C377	ECEA1CU470	47
C378,379	ECFR1H104ZF	0.1
C380	ECFR1H104ZF	0.1
C381	ECEA1HU010	1
C382	ECEA0JU470	47
C601 ⚠	ECEA1HN2R2S	2.2
C602	ECEA1HU2R2	2.2
C603	ECEA1HU010	1

Notes:

1. **S301, 302** : Speed selector switch.
2. **S303** : Start/stop switch.
3. **S304** : Cueing switch.
4. **S401** : Reset switch in "**off**" position.
5. **S601** : Power switch in "**on**" position.
6. **S602** : Votage selector in "**220-240V**" position
   110-120V ⟷ 220-240V
7. The voltage value, and waveforms are the reference voltage values of this unit measured by DC electronic voltmeter (high impedance) and oscilloscope on the basis of chassis. Therefore, the voltage value and waveform may include some erroe due to the internal impedance of the tester or the measuring set.
   * ☐ is the voltage when turntable is in stop.
   * ( ) is the voltage when turntable is in rotation. (at 33 rpm)
   * ⌐ ⌙ is the voltage when cueing is down.
8. ▬▬ +B voltage lines
9. Important safety notice:
   Components identified by ⚠ mark have special characteristics important for safety.
   When replacing any of these components, use only manufacturer's spedified parts.
10. The part No. of diodes mentioned in the schematic diagram stand for production part No. Regarding the part No. with ✪ mark the production part No. are different from the replacement part No. Therefore, when placing an order for replacement part, please use the part No. in the replacement parts list.

• Terminal guide of transistors, diodes and IC's

AN6675	AN6680	MN4011B 14 Pin MN4027B 16 Pin MN4516B 16 Pin	
			
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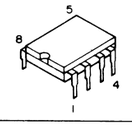	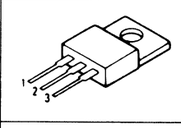	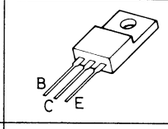	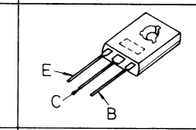
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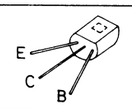	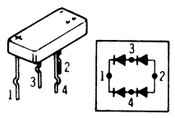	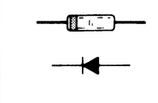	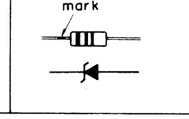

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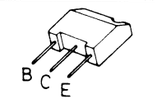
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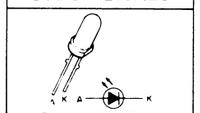

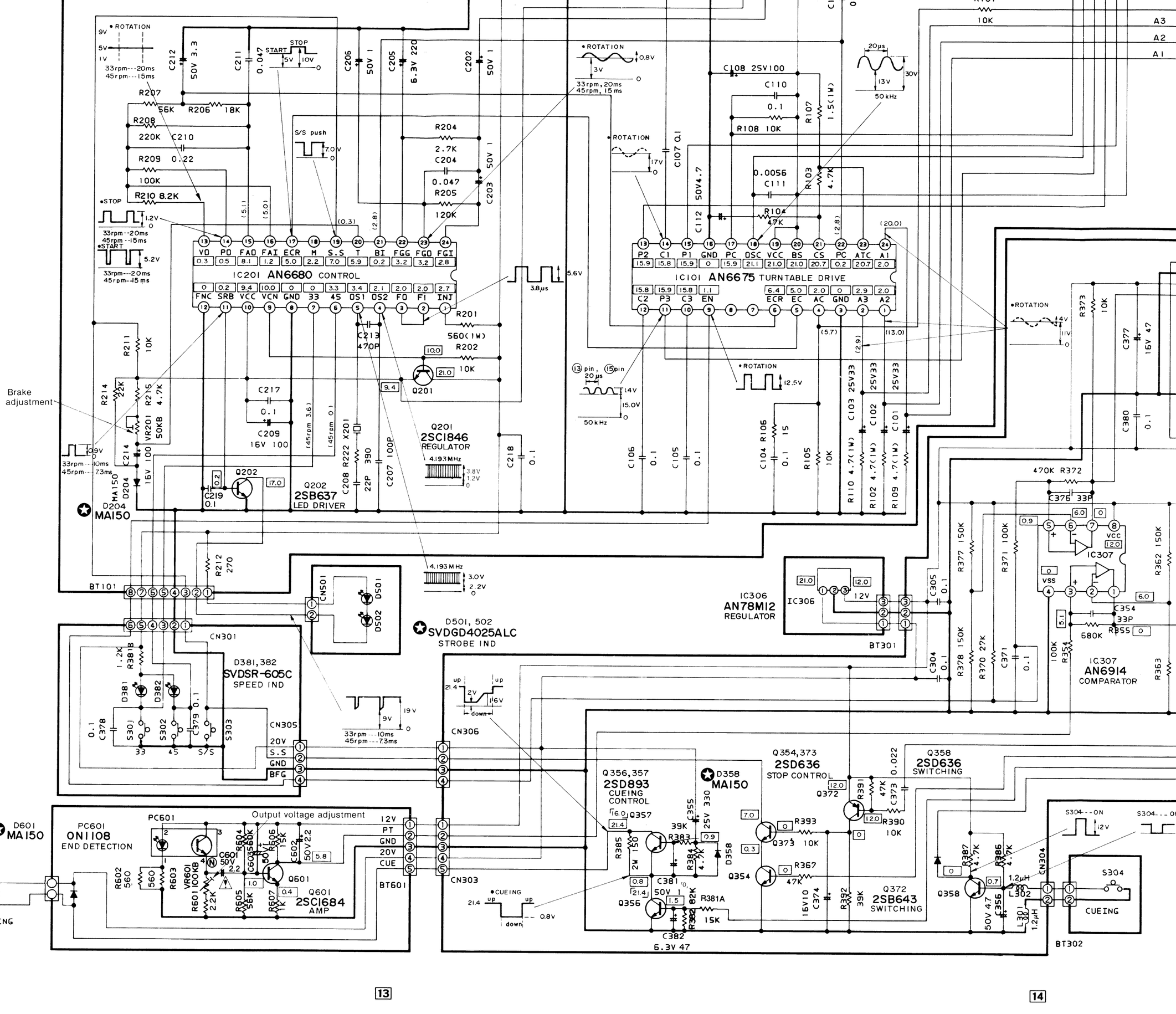
IC201 AN6680 CONTROL
VO PO FAD FAI ECR M S.S T BI FGG FGO FGI
FNC SRB VCC VCN GND 33 45 OS1 OS2 FO FI INJ
IC101 AN6675 TURNTABLE DRIVE
P2 C1 P1 GND PC OSC VCC BS CS PC ATC A1
C2 P3 C3 EN ECR EC AC GND A3 A2
Q201 2SC1846 REGULATOR
Q202 2SB637 LED DRIVER
D204 MA150
D501, 502 SVDGD4025ALC STROBE IND
D381,382 SVDSR-605C SPEED IND
IC306 AN78M12 REGULATOR
IC307 AN6914 COMPARATOR
PC601 ON1108 END DETECTION
Q601 2SC1684 AMP
Q356,357 2SD893 CUEING CONTROL
D358 MA150
Q354,373 2SD636 STOP CONTROL
Q358 2SD636 SWITCHING
Q372 2SB643 SWITCHING
Brake adjustment
Output voltage adjustment
CUEING
BT101
BT301
BT302
BT601
CN301
CN303
CN305
CN306
CN501
S/S push
•ROTATION
•STOP
•START
33rpm---20ms 45rpm---15ms
33rpm---10ms 45rpm---73ms
50kHz
13 pin, 15 pin 20μs
4.193MHz
A3
A2
A1